WORKING PLAN

OF THE

GANGES WORKING CIRCLE.

GANGES FOREST DN., CENTRAL CIRCLE,

NORTH-WESTERN PROVINCES AND OUDH.

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WORKING PLAN

OF THE

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GANGES FOREST DIVISION, CENTRAL CIRCLE, N.-W. P. AND OUDH.

By N. Hearle, Esq., Offg. Dy. Conservator of Forests, School Circle.

CHAPTER I.

SITUATION, BOUNDARIES, AREA AND HISTORY.

1. The forests, for which this preliminary working plan has been prepared, are situated in British Garhwál, and form part of the Ganges Forest Division.

This division comprises :—

		Acres.
1.	The forests on the outer ranges of the Himálaya in Garhwál extending from the Kho to the Hiu river above Lachman Jhula, forming the Udepur and Gori ranges, with the exception of Chandi and containing	90,396
2.	The Chandi forest in Bijnor, forming a part of the Gori range, containing	41,739
3.	The Kohtri Dún in Garhwál, containing	90,880

A large portion of the Chandi forest is very badly stocked and has not been considered worth valuing ; whilst, on the other hand, it has been determined to frame a separate plan for the Kotri Dún, which contains some valuable sál.

The present preliminary working plan is, therefore, for the forests included under No. 1.

2. The boundaries of the working circle, as will be seen from the accompanying map, are : on the east the Kho river from pillar No. 65 on the northern boundary to the road from Kotdwara to Mawakot ; on the south by the forest road from Kotdwara to Chaukighata *viâ* Mawakot and along the base of the hills to the Teli sot and down that sot to the sub-montane road, the boundary between the Bijnor and Garhwál districts, and then along that road to the Ganges ; on the west the Ganges to pillar No. 1 at Khakoti above Lachman Jhula ; and on the north a line of boundary pillars from pillar No. 1 at Khakoti to pillar No. 65 on the Kho, along very troublesome and precipitous ground separating the Government from the district forest and from the villages and cultivation of British Garhwál.

3. The outer forest boundary is well demarcated by 65 pucka square masonry pillars 3′ × 3′ × 4′, whilst pillars also square and 2′ × 2′ × 2½′ have been built to mark off the boundary between the forests open and those closed to rights of usage.

There are in addition 318 round pillars 4½′ in girth by 2½′ high, demarcating the chaks or village lands within the forests in the Kunau, Bedasni, Dogadda and Luni blocks.

The lengths of the three kinds of boundaries are as follows :—

	Miles.	Chains.
Outer	94	...
Open to rights	49	54
Village lands	37	26

These figures are open to correction.

History.

4. From time immemorial the forests along the foot of the hills to which alone any fiscal value pertained, as well as those within the hills, were considered the property of the ruling power, and, as such, invariably formed a source of revenue to the State. At the beginning of British rule all forest dues were leased out to contractors according to the old system In 1849 the collection of the forest and pasturage dues from the Kotri Dún and from Udepur was handed over to the Superintendent of the Dún and to the Collector of Bijnor. In 1853 the dues from the Kotri Dún and the Rawasanwar part of Udepur amounted to Rs. 1,403 and from the Rawasanwar portion to Rs. 1,011 a year. In 1858 the forests came under Major (now General) Ramsay, late Commissioner of Kumaun, who was the first Conservator. He at once abolished the contract system, and gradually induced cultivators to take up lands south of the sub-montane road, leaving the valuable forest land to the north untouched.

5. The management of the forests was transferred to the Imperial Forest Department in 1868. In 1879 they were declared reserved forests, according to section 34 of the Indian Forest Act of 1878, by G. O. No. 162 of the 24th February, as far as Garhwál is concerned, and a schedule was also given of all village lands situated within forest; limits but although the "*Haquk*" forest, *i.e.*, those open to rights, were marked on the maps by a committee which was held at Rámnagar on the 23rd January, 1879, their boundaries do not appear to have been notified. The whole of the Garhwál Forest Division from the Rámganga to the Ganges was divided into five blocks, of which the last three form part of the forests included in the present working plan, *viz.* :—

III.—The Saneh forest, with an area of 17 square miles, lying between the Kho river on the east and the Malan river on the west as far as Chaukighát.

IV.—The Laldhang forest, with an area of 36 square miles, lying between the Malan river on the east and the Rawasan river on the west.

V —The Khara forest, with an area of 88 square miles, lying between the Rawasan and the Ganges.

6. The Ganges Forest Division was formed in December, 1879, and contained the forest blocks Nos. 3, 4 and 5 of the old Garhwál Division just mentioned and the leased forests of the old Bhagirathi Division. In November, 1880, the Chandi block was taken over by the Forest Department from the Superintendent of the Roorkee Workshops and attached to the Ganges Division. On the 1st of April, 1885, the Bhagirathi forests were abandoned, and the Kotri Dún east of the Kho river was transferred from the Garhwál Division.

7. The following figures show the revenue and expenditure of the division under the different budget sub-heads from 1880-81 to 1884-85, exclusive of the Bhagirathi forest but including the Chandi forest, as it was found impossible to separate the accounts of the latter from the other forests in the Bhábar.

Revenue in Rupees.

Sub-head.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	Average.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs
I*a*.	14,572	27,178	15,020	9,035	...	13,161
II*a*.	13,622	10,964	11,008	8,044	40,354	16,798
II*b*.	664	779	1,854	1,991	2,040	1,666
II*c*.	27,442	36,643	35,572	36,861	28,400	32,984
II*d*.	1,543	1,632	1,821	2,353	2,937	2,057
II*e*.	2,015	2,408	1,859	3,137	2,785	2,440
III.	1,128	757	281	63	125	471
	60,986	80,356	67,415	61,484	76,641	69,376

Expenditure.

Sub-head.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	Average.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
A.I*a*.	8,289	10,321	8,684	6,919	1,646	7,172
A.II*a*.	2,919	3,427	3,679	4,142	4,366	3,707
A.III.	5	59	40	5	...	22
A.VI*a*.	...	800	...	...	...	160
AVI*b*.	599	719	1,097	1,042	1,206	933
A.VI*c*.	181	523	100	677	537	404
AVII*a*.	1,258	1,110	1,129	1,500	2,507	1,501
A.VII*b*.	...	1,500	3,552	3,173	1,296	1,904
A.VII*c*.	...	51	..	...	...	10
A.VIII*a*.	128	846	1,427	45	503	590
A.VIII*c*.	...	...	...	70	1,443	303
A.VIII*d*.	..	38	245	111	34	86
A.VIII*e*.	214	640	721	807	526	582
A.VIII*f*.	20	35	29	117	5	41
A.IX*a*.	...	18	...	...	...	3
A IX*c*.	150	150	150	176	86	142
Total A ...	13,763	20,237	20,853	18,784	14,155	17,560
„ B ...	10,909	12,579	18,414	14,436	18,691	15,006
GRAND TOTAL ...	24,672	32,816	39,267	33,220	32,846	32,566

The Revenue establishment is temporary and charged under AII, but all the other subordinates are on the permanent list. No rangers are at present entertained, the most highly-paid subordinate being a forester on Rs 40 per month. The division also maintains a treasury establishment at a cost of Rs. 690 per annum, contributes Rs. 360 towards the Kotdwara dispensary, and Rs. 1,584 for the Bhábar police establishment, consisting of 1 thanadár, 2 jamadárs, 1 muharrir and 15 chaprassis, who in addition to their work in the district take charge of forest revenue and escort it to the treasury at Najibabad.

8. The system of working these forests, which has, subject to modifications, been in force for many years, is described as follows :—

About the month of October in each year the officers in charge of the Kumaun, Garhwál and Ganges Divisions send out notices intimating that the forests and the revenue depôts will be opened from a certain date, generally the 1st November, until some date in the following spring or summer. They inform intending exporters that—

(I) green standing trees can only be cut with the previous sanction of the divisional officer. An exception to this rule is sometimes made in the case of certain species which are mentioned :—

(II)—fallen green trees may be removed under the pass and mark of foresters in charge of ranges or beats ;

(III)—bamboos may, subject to certain restrictions, be cut under permits for specified areas issued by range officers ;

(IV)—any other produce may be exported with these restrictions—

(*a*)—that permission to work be taken out and the forest rules observed;

(*b*)—that certain blocks may be closed against the export of certain articles and

(*c*)—that cattle cannot enter the forests without first having paid the grazing dues, or remain in the forests save at authorized cattle-stations.

Intending exporters, who propose to remove green timber, apply to the divisional officer for permission, and, on their signing an agreement, they receive permission to cut trees in certain localities, all such trees being marked in the first instance by forest officials; and before the logs or scantlings are actually taken away, a forest official makes out a pass in which the quantity removed is given, and this is taken by the exporter to the revenue depôt, where the amount due is paid, so that the control for green timber is complete. Exporters who propose to remove any forest produce, other than green standing trees or bamboos, proceed to the nearest revenue depôt where they take out a permit to work within a certain tract of forest. This permit is in triplicate, one copy is given to the exporter, another is sent to the officer in charge of the range for which it is issued, the third is filed at the revenue depôt. On receipt of permits, exporters go to the forest and cut and remove what they require, and they pay for it on their return journey at the nearest revenue depôt. Export except by routes on which depôts have been established is prohibited.

CHAPTER II.

Configuration of the ground.

9. The working circle forms part of what are generally known as the Bhábar forests, and comprises about 141 square miles of forest on the outer ranges of the Himalaya and on undulating and flat ground at their base.

10. These outer ranges nearly always form part of the Sub-Himálayas, which may be described as a belt of fringing ridges varying in width and abruptly lower than the contiguous mass of the Himálaya, occurring throughout their whole length, and being in a more or less marked degree semi-detached from them by a chain of deep longitudinal gorges and low gaps corresponding with a leading geological boundary, that between the old slaty and schistose rocks of the mountains and the massive tertiary sandstones of these fringing hills.

11. The hills along the upper forest boundary and for some distance below it have, as a rule, a very rugged appearance, rising at times to 4,000 and, in the case of the Merhal peak, to 4,500 feet. This high range is not more than five miles in a straight line from the foot of the hills, hence the valleys and ravines are mostly very narrow and deep. It follows that these hills are precipitous and much cut up by the numerous small feeders of the main streams. This part of the division is very inaccessible, the only paths being along the beds of torrents, full of boulders, hemmed in either by sheer walls of rock or by precipitous slopes on either bank. From the Merhal ridge spurs with precipitous sides come down towards the Ganges, and the boundary between the rocks of the Sub-Himálayan series is here generally well marked by a great difference of gradient, the slopes being moderate or even gentle as the Ganges is approached. The slopes facing the Bedasni are somewhat less precipitous and the forests can be more easily worked.

12. Nearer the plains the ground is still generally precipitous, but moderate slopes are of more frequent occurrence, especially so near the Ganges in the Mundhal, Andermajhera and Dogadda blocks. The hills sometimes terminate abruptly, rising with a considerable slope from the flat, or occasionally end in broad chaors, as in the lower portion of the Sukrau, Malan and Kunau blocks.

13. Included within the forest boundary is a stretch of flat land at the foot of the hills mainly between the Malan nadi and the Mitawali sot. There are also smaller areas of flat land bordering the Ganges and the principal minor streams, such as the

Kho, Rawasan, Mundhal, Dogadda and Bheng, and in addition the numerous islands in the Ganges. West of the Kho the Siwaliks are altogether absent for about 20 miles, and then a small block of them is met with extending for about eight miles east of the Ganges. These latter are mainly in the Chandi forest in Bijnor, and only enter the working circle along the southern boundary of the Mundhal block.

14. The principal streams are the Kho, forming the eastern boundary, the Gewai, Sukrau, Gwalgarh, Malan, Sigadi, Rawasan, Luni, Mitawali, Mundhal, Dogadda and the Bedasni or Bheng. The forest areas drained by them are as follows :—

	Acres.
Kho	1,283
Gewai	1,821
Sukrau	4,374
Gwalgarh	1,361
Malan	3,221
Sigadi (including basins of Toli and Chamaria sots)	10,873
Rawasan	7,082
Paili (including the basins of Pandowali, Suni and Mitawali sots) ...	14,552
Mundhal	7,866
Basins of the Ghasiram and Gamera sots and island opposite Chila ...	3,337
Dogadda	4,223
Bheng	3,768
Flats, &c., along the Ganges and the hills draining directly into that river together with its islands and the basin of the Suni sot ...	17,635
Total ...	90,396

There is always a good and permanent supply of water from these streams towards the upper forest boundary, but as we go south the supply becomes scantier, and we have here a belt of forest in the Bhábar proper remarkable for the entire absence of water, a phenomenon eminently characteristic of this tract. The great rivers preserve their course with some diminution in their volume, but all the minor streams that have their origin in the lower hills on entering this belt soon lose themselves in the shingly deposit that constitutes the substratum. In the rainy season alone torrents cut into the ground and the channels thus formed exhibit characteristic sections of this remarkable tract. We then find that there is but a thin covering of alluvial soil on a vast dry bed of boulders and of shingle through which all rain that falls sinks rapidly, and which absorbs in the same way all the minor streams of the outer ranges. The waters of the Kho, the Sukrau and the Malan nadis have been utilized by the Senior Assistant Commissioner of Garhwál for irrigating the cultivation around Kotdwar between the outer forest boundary and the submontane road.

15. Owing to the precipitous and inaccessible character of these hills it has been found necessary to exclude large areas from the valuation survey, and the following is an estimate, necessarily very rough, of the area of flat and hilly ground and of ground excluded from the valuation survey :—

	Square miles.	Acres.
Flat	29	105
Hilly	88	555
Excluded from valuation .	23	136

the ground being either very precipitous, inaccessible or consisting of river beds, &c.

In the area shown as flat are included the chaors with very gentle slopes. For particulars of each compartment *vide* Appendix A. The gradient towards the upper boundary is usually over 30,° whilst lower down it varies from 20° to 30,° though often above the latter figure; but such a statement does not give a fair idea of the irregularity of the slopes; and we quote below Mr. Dansey's remarks on the configuration of the Patli Dún forests, as they apply with even greater force to the hilly portion of the forest now under report. He says:—"The steepness of the ground often alternates so rapidly and in such a confused manner, with gentle slopes or undulating

ground, and those again with almost precipitous descents, that the feature of the slope is less apparent to the observer, less easily seized upon than the absolute irregularity and broken nature of the whole."

16. Over such a large area every aspect is of course represented, but all the main streams have a south-westerly to westerly course, so that the commonest aspects are north-west, south-east, north and south. The Kunau block faces west and the Bedasni block partly east and partly north and west.

CHAPTER III.

Rock and soil.

17. At my request Mr. Middlemiss has kindly written a memo. on the geology of the district.

He says:—

"The geology of the forest lands between the debouche of the Ganges above Hardwár and the Koh at Kotdwár may be generally represented as follows:— An unknown thickness of ancient metamorphic rock forms the backbone of the district, and appears occupying nearly all the hills between 4,000 and 6,000 feet in height. The lower ranges, west towards the Ganges and south towards the plains, consist of two different sets of formations arranged concentrically round the elevated metamorphic area; the inner of these zones comprising relics of the Mesozoic and lower tertiary age. It is these Mesozoic and tertiary rocks fringing the higher metamorphic region which are at present the most forest-covered.

18. "Taking the outer band of upper tertiaries first, they may be described almost in a word as soft, brown, micaceous sandstones, which give rise to a style of country characterized by steep hillsides and deep ravines. The rock is one easily removed by denudation, and in which roads can be cut with similar facility, though constantly liable for the same reason to get out of repair during the rains. Interstratified with the brown sandstone there are some purple shales and clays at different horizons, a rock extremely friable and likely to cause landslips.

"In one portion of the area under consideration, *viz.*, in the low hills between Hardwár and the Mitawala sot, there is a still softer rock material which only merits the name of sand-rock.

"It is of a pale yellow color and is stratigraphically of higher horizon than the brown sandstone. Again, in the central part of these low hills, coming in turn above the pale-tinted sand-rock, there is a partially solidified coarse quartzite conglomerate, which weathers into numerous steep scarps. Its workability for roads, &c., depends upon the amount of solidity which it has acquired: if thoroughly hardened it resists blasting almost like granite; and where loose and incoherent constant landslips are sure to take place.

"Such are the superficial petrological characteristics of the upper tertiary zone. It is bound by hard-and-fast lines on the south by the alluvial plain at the foot of the hills, and on the north by a reversed fault, striking as follows:—

"From the Ganges near the junction with the Bheng nadi it runs along the upper reach of the Dhaura (Dogadda) sot, separating the Banas ridge from the Ghugtigarh trigonometrical station (4,450 feet). Thence it passes one mile south of Amola in a straight line to Simalna, thence keeping three quarters of a mile south of Mathana, and thence to Umrela near the Koh.

19. "The inner Mesozoic and lower tertiary zone is only about a mile broad between the Koh near Umrela and the Bheng at Bedasni.

"Throughout this strip of country it consists of quartzites, grits and calcareous grits with fossils, probably of jurassic age. The dip towards the north-north-east

about 60° in the order enumerated, the quartzite being the lowest number. Above them come lower tertiary shales and grits, pale grey or purple in color, the shales having associated with them thin earthy nodular limestone bands containing nummulites. They have a small development only and dip down against the outer edge of the metamorphic series; the nature of the contact being generally a reversed fault. On the south this zone is bounded by the upper tertiaries just described, whilst the northern boundary, running parallel with the southern, and only a mile distant from it, can be readily apprehended without further details.

"North of the Bheng nadi, however, the boundary, between this zone and the metamorphics, runs N. 10°E. from Bedasni until a mile north of Mohan, when it changes again to east-south-east until, meeting the Hiu river, it once more strikes north to Dhunyar. Between this boundary line and the Ganges the Mesozoic rocks described have a similar position to that further east, except that the general strike of the beds is now nearly north and south. But in addition we have the incoming of another formation; a massive blue-grey limestone, appearing at intervals between the Bheng and Merhal station and underlying the quartzites, grits and calcareous grits. Between Merhal station and Lachman Jhula it swells out and attains great thickness, forming rugged and steep side ridges.

20. "The ancient, inner, metamorphic series cover all the rest of the district under treatment, and consist of schistose slates, schists, quartz-schists and quartzites The quartzites and quartz-schists are exceedingly hard, but much jointed and splintery, whilst the schists and schistose beds, though sometimes forming a durable rock, are mostly weathered at the surface into a soft shining soil, due to the great proportion of the mica present in them. With the exception of the quartzite ridges which are steep and barren, the hillsides of the softer schist are terraced into fields by the hillpeople from summit to base, and consequently forest is entirely absent from them."

21. From this description it will be seen that these forest lands belong geologically to the Sub-Himálayan series, the hills of which are everyhere easily distinguishable from the much higher mountains to the north of them by difference of elevation and of contour. They very commonly present a steep face to the south with a more gentle inner slope, and, as a rule, they consist of two ranges separated by a broad flat valley or "dún." When the outer of these ranges is wanting, as is the case over the greater part of the area under discussion, the whole geographical feature might escape notice, the inner range being confounded with the spurs of the mountains. From a point of view whence all the surface features can be seen, it will however generally be observed that the hills are not branching extremities of the spurs from the main ridge, but longitudinal flanking ridges, separated from the higher range by a line of gaps and gorges: or at least there will always be noticed a rapid increase of elevation immediately inside the tertiary boundary.

22. The striking agreement in character between the Sub-Himálayan rocks and the actual deposits now in progress of formation from Himálayan débris, at once suggests that the mountain border must have been to some extent defined and the Himaláyan area undergoing denudation from early tertiary times. The accumulaton of coarse conglomerate is immensely greater in the immediate vicinity of the large rivers of the Himálayan system, and, moreover, it is only within range of those streams that we find the beds of large rounded blocks of quartzite and other hard rocks such as are now brought down by those great torrents.

The conglomerates south of the Mundhal, where that stream takes an abrupt turn to the west, may be quoted as an example. In the intervals between the rivers such conglomerates are formed almost exclusively of the débris of the adjoining hills, the same as are found in the minor streams now flowing from those hills, but in this position sandy clays often constitute the bulk of the formation.

23. As previously mentioned, within eight miles east of the Ganges and mainly in the Chandi forest bordering the area under discussion, the Siwalik rocks proper are

well represented and a narrow belt of Nahan beds separate them from the slaty rocks of the lower Himálayan mountains. Further east the outer range and the rocks forming it seem to be generally absent; and the inner hills, formed of the massive sandstone supposed to belong to the lower Siwalik or Nahan group, become very prominent. They lie in conformable sequence beneath the fossiliferous zone of the Siwalik series, and the rocks are of the same type, but have a decidedly different aspect—strong sandstones but of a darker hue and often highly indurated with hard clays generally of a deep red or purple color. Throughout the Himálayan range east of the Sutlej they form the flanking ridges close under the higher mountains and inside the dúns; or at least they mostly occupy that position, for it cannot be said that the Siwaliks do not occur there too.

The hills of this zone, known as the Nahan group, range from 3,000 to 5,000 feet, while the summits of the adjoining mountain range vary from 6,000 to 8,000 feet. Their distinctness as a range is, however, well marked by the line of low gaps and gorges spoken of above. In the Eastern Dún from Rájpur to the Ganges, this flanking range has been removed, but east of the Ganges it appears again in great force right up to the Nepal frontier.

24. The small remnant of the Subathu beds which occurs east of the Ganges, after a blank of 60 miles, is exactly in the line of continuation of the main area on the outskirts of the lower Himálaya. It differs in no respect from what is found at Subathu,—pale greenish-brown and red clays with concretionary layers of earthy fossiliferous limestone. The locality is just opposite Rikhikesh, about two miles to the south of the Marhal summit in compartment No 3, Bedasni block, and just north of the village of Bhuwan in an abrupt depression in the ridge which runs nearly parallel to the Ganges for about half the width of the Dún. The slope is of decomposing ferruginous slate and sandstone, and in the depression, which is about half a mile wide, we find the abovementioned remnant of the Subathu group.

25. In the gorge cut by the Tal or Bheng nadi through this ridge, is a rock which, contrary to nearly all other lower Himálayan rocks, is fossiliferous. The fossils are indeed very obscure fragmentary impressions of *bivalve mollusca*, but they are undoubted organic remains, and it will be seen that Mr. Middlemiss ascribes them to the jurassic period. The rock is a sandy siliceous limestone, in thick beds; but the whole is not more than 20 or 30 feet in thickness. The band occurs twice in the short gorge, being repeated by a sharp anticlinal flexure. The beds associated with this limestone are pink, grey and black shaly slates, the latter being often crushed, highly carbonaceous, ferruginous and sulphureous, after the manner of the Infra-krol rock.

26. Between the Koh nadi and the Mitawali sot, or over the greater portion of the forest, the soil is usually sandy with some clay in places, and the massive sandstone rock is constantly outcropping. The soil is, as a rule, superficial, though occasionally of a fair depth; but owing to the heavy rains and in part to the want of fire-protection, very little is allowed to remain on the precipitous slopes. There is usually a narrow deposit of alluvium along the streams, and on the level ground at the base of the hills there is a more extensive alluvial deposit of sand or of sandy gravel with a fair proportion of clay.

27. South of the Mundhal, at the place where this stream turns to the west, the soil is clayey and superficial, overlying a conglomerate already referred to, which is of greath depth, consisting of large boulders and pebbles of all sizes mixed with clay; it is very unfavourable to good forest growth. From a little above this point there is a broad band of alluvium along the Mundhal as far as its mouth, containing some fine young shisham.

28. North of the Mundhal in the Andermajhera and lower parts of the Mundhal and Dogadda blocks clay is common, the ridges generally consisting of a stiff red

or yellow clay with a more or less strong loam lower down; some alluvium is found in the valleys. North of the Bheng nadi the soil is either loamy with a large percentage of clay or a stiff red or yellow clay.

The principal rocks are shales, hard sandstone or metamorphic rocks, whilst on the higher ridge, of which the Marhal peak forms the summit, there is compact limestone.

CHAPTER IV.

CLIMATE.

29. As I only spent a little over two months in the Ganges Division during the cold weather of 1884-85, my personal acquaintance with the climate is necessarily very limited, but it may be useful if I give a short précis from the Gazetteer of the North-Western Provinces touching on the most prominent features of the meteorology of the district.

Sketch of climate.—The three seasons, the cold, the hot and the rainy, are well marked. After the close of the rains at the end of September or beginning of October, the sky is serene and the atmosphere transparent, owing to the absence of cloud and the rapidly diminishing proportion of water vapour; the air is also very diathermanous; that is, it permits the free passage of heat from the sun in the day time, and in the calm nights that prevail at this season, the radiation of heat into space goes on so rapidly that the earth's surface and the air resting on it becomes very cold before morning. The months of October and November are thus characterized not only by clear skies and calms, but by a great temperature range and heavy dews at night. These conditions prevail through the greater part of December, and towards the end of that month and in the beginning of January the exposed thermometer sometimes falls 10 degrees below freezing at places as far down the plains as Allahabad and Benares. About the end of December and in January and February, however, clouds often interfere with the free radiation of heat at night, and the daily range of temperature for these months is less, on the average, than that of November. Some rain usually falls at this time of the year. In March and April the temperature rises rapidly, especially at a distance from the mountains, and the air becomes extremely dry. Hot winds from the west or north-west blow down the valley of the Ganges and the appearance of the whole forest changes, the grass and much of the undergrowth drying up, whilst many of the trees shed their leaves, and many burst into flower. Rain seldom falls in the hot weather, the falls that do occur generally taking place during thunderstorms.

About the middle of May, however, the quantity of vapour in the air begins to increase rapidly, betokening the approach of the rainy season. This vapour is probably brought by the prevailing south-west upper current of the atmosphere, which seems to descend gradually until it merges with the surface sea winds of the Bay of Bengal and forms the "south-west monsoon" or prevailing wind of the rainy season. In Northern India the lowest strata of the sea winds are deflected from their normal course by the mountains and directed towards the seat of highest temperature in the Panjáb, thus appearing as east or south-east and not as south-west winds.

Along the foot of the hills these easterly winds are felt occasionally by the middle of May, when the quantity of vapour in the air first begins to show signs of a rapid increase.

During the latter half of June the sea winds increase in strength and gradually advance along the foot of the Himálaya, until by the beginning of July the rains have usually set in. In ordinary years rain continues to fall, not steadily, but with frequent intermissions or "breaks" until about the end of September, when the easterly winds cease except close to the hills, where they last a month longer and are succeeded by calms or feeble currents from the west.

30. *Temperature.*—During the rains the temperature averages about 85 degrees. The accompanying table gives the mean monthly and annual temperature of certain places in or adjacent to the North-West Himálaya at elevations similar to those found in our working circle. The daily range at this time varies from 8 to 12 degrees, being greatest in the driest districts.

In the mountains every altitude has its own special temperature, from the lower valleys where the heat is still overpoweringly great to the regions of eternal frost; but at all elevations in summer the force of the sun's rays is excessive.

Table showing mean monthly and annual temperature.

Names of places.	Elevation in feet.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.	Number of years.
Roorkee ...	887	56°·7	61°·1	70°·5	81°·5	87°·9	90°·8	85°·2	84°·1	82°·7	75°·5	65°·	57°·5	74°·9	17
Srinagar ..	1,950	...	...	...	71°·	80°·	84°·	79°·	84°·	79°·	...	...	...	...	...
Dehra ...	2,232	54°·8	58°·	65°·8	76°·1	82°·1	84°·9	80°·2	79°·	77°·3	70°·4	62°·5	56°·2	70°·6	12
Hawalbagh .	4,114	47°·	55°·	61°·	66°·	73°·	76°·	78°·	79°·	75°·	69°·	60°·	52°·	65°·8	1
Dharmsala ...	4,495	44°·6	49°·4	57°·3	68°·3	72°·3	75°·8	70°·7	69°·6	69°·	64°·6	57°·7	50°·5	62°·5	4—5

Both the diurnal and the annual range of temperature decreases on ascending from the plains to a height of 6,000 or 7,000 feet, and it is owing to the latter cause that the diminution of temperature in the first 6,000 feet of ascent is most rapid in the hottest months and least so in the cold season.

The low temperature of the plains in the winter season, especially in the morning, is doubtless due in part to the draining down of cold air from the mountain slopes through the river gorges. This, however, cannot appreciably affect the temperature of places at a long distance from the mountains. In the mountain country itself it often happens for the same reason that the temperature of the air at the bottom of a valley is distinctly lower than on the adjacent ridges.

In the North-West Himálaya it has been calculated from observations at Roorkee, Dehra, Naini Tal, Ránikhet and Bareilly that the mean annual rate of decrease of temperature is 1 degree for every 338 feet of increase in height, but the rate varies from month to month, being least in the cold weather and greatest in the hot season.

The minimum temperature of the day occurs about sunrise, that is, at 6 A.M. on the average of the year, and the maximum is attained about 2 P. M.

31. *Winds.*—The transfer of air from the plains to the mountains and its retransfer to the plains at night, are brought about by its expansion and contraction under the influence of heat and cold. In the day time the air over the plains expands more than over the hills, because the total thickness of air is greater and the range of temperature is probably higher. The surfaces of equal pressure which we may assume to be horizontal on the average are thus raised more above the plains than on the mountains and the air under the influence of gravity flows down the incline towards the mountains. At night the air contracts and these surfaces sink more above the open plains than in the hills, and there is thus a slope or gradient in the opposite direction. At the debouches of the principal streams into the plains, as, for example, of the Ganges at Hardwár, this night wind blows down with great violence, particularly in winter, and is commonly termed the "dadu." This wind, however, would not appear to be altogether due to the same cause which produces the ordinary down winds, but to the accumulation of cold air in the deeper valleys. The air collected in these aërial lakes, as they may be called, having no means of escape but the opening through which the drainage is carried off, pour from them in a current the velocity of which will be dependent on the depth and area of the mountain basin from which it flows.

32. *Humidity and cloud.*—The quantity of water vapour present in the air at any time depends on the temperature, the distance from the sea or other evaporating surface, and the direction of the wind.

These relations are very distinctly marked on the North Indian plain, where the high temperature range in the yearly period and the semi-annual change of the winds combine to render the proportion of vapour in the air during July and August nearly three times as great as in December and January. A high temperature cannot, of course, increase the quantity of vapour in the air, unless it be in a region where vapour is being generated. Thus we find that at Roorkee the vapour pressure hardly varies from December to April, though as soon as the sea winds set in about the middle of May, the proportion of vapour rapidly increases.

At Bareilly, where the surrounding country is moister and better wooded than at Roorkee, there is a slight increase of vapour in the hot weather months.

On the southern slope of the mountains the annual variation of vapour tension is similar to that which obtains on the plains, though because of the considerable evaporation from the forest-covered slopes, and the occasional showers of rain which fall, the increase of vapour during the hot weather goes on much more uniformly than on the plains. In the mountains also the mean vapour tension decreases very rapidly with the height, on account of the rapid decrease of temperature as we ascend; and it is found that a vapour pressure equal to half that observed on the plains is attained at an elevation of 7,000 or 8,000 feet.

The relative humidity of the air is probably greater at all elevations on the Himálayan slope than on plains; and it is doubtless greater on forest-clad slopes and valleys than on steep and bare mountain-sides.

On a high ridge too which intercepts and deflects upwards the prevailing south-west winds, thereby cooling them and partially condensing their vapour, the degree of saturation is greater than on the lower ridges or valleys behind it; for the air in sinking after crossing the high ridge is warmed and rendered capable of absorbing more moisture than it has been able to retain in crossing the ridge.

33. *Rainfall.*—In the North-Western Provinces the average rainfall of stations at a distance exceeding twenty miles from the Himálaya is 40·1 inches, and that of stations at a distance less than twenty miles is 46·6 inches.

The following table shows the rainfall of Hardwár, Bijnor, Nagina, and Najibabad, four stations within a day's march of the Ganges forests and less than twenty miles from the Himálaya, as well as that of Dehra and Naini Tal.

Station.	Elevation in feet.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year	Number of years.
Hardwár ...	1,100	2·98	2·80	1·04	0·08	0·45	4·38	10·33	16·59	5·56	1·03	0·06	0·39	45·69	5—6
Bijnor ...	800	1·14	1·22	0·86	0·54	0·70	4·81	10·47	9·32	5·41	0·53	0·05	0·40	35·45	31—33
Najibabad ...	870	1·19	1·92	0·92	0·78	1·02	5·64	15·50	14·11	7·23	0·88	...	0·71	50·20	16—17
Nagina ...	850	18	1·79	0·81	0·54	0·95	5·03	14·24	13·02	6·24	0·54	...	0·72	45·06	16—17
Dehra ...	2,230	2·06	2·10	1·41	0·73	1·39	8·32	24·61	23·66	9·14	0·75	0·07	0·62	74·86	31—33
Naini Tal ...	6,600	3·04	3·24	2·34	1·78	2·97	15·42	24·60	23·77	10·24	1·80	0·15	1·59	90·94	30—31

The variation of rainfall with height can only be roughly determined because every high ridge and peak cuts off the supply of vapour from the lower ground to the north of it, but the average rainfall on the southern slope of exposed mountain ridges would probably be as follows:—

At 800	feet above the sea	43	inches.
1,000	"	60	"
2,000	"	125	"
3,000	"	159	"
4,000	"	154	"
5,000	"	149	"

From this it would appear that the maximum rainfall occurs at about 3,000 feet above the sea.

By far the most important cause of rain in the Himálaya is the cooling of the air by expansion as it ascends the mountain slope. The air in rising to surmount the barrier has its heat rapidly converted into the work of expansion, and it commences to precipitate rain when the temperature falls to the dew-point.

When once condensation begins, the rate of decrease of vapour with height will be a measure of the quantity condensed, or the rainfall.

The variation of rainfall with season is very distinctly marked.

In the great majority of years no precipitation whatever occurs in November or in the first half of December.

About Christmas a few showers fall, and these winter rains continue at intervals until February or March, being at their maximum in January.

The temperature increases so rapidly in March and April that the tendency to precipitation and consequently rainfall becomes less than in January and February, though the upper currents continue to blow from nearly the same direction as in winter.

About the middle of June, usually, and sometimes before the end of May, the hot north-west winds of the plains give way to sea winds from the Bay of Bengal. The whole of the lower atmosphere over India is then moving towards the Himálaya, and the upper deflection of the air currents by the mountains cause frequent precipitation of rain in the manner already described.

The rainy season almost always commences sooner on the mountains than on the plains, for saturation is reached first at high elevations and then propagated downwards by the cooling effect of the falling rain-drops and the cutting off of the sun's heat by the clouds. July and August are the rainiest months of the year.

About the end of September or beginning of October the rains cease, and their sudden cessation seems to be in some measure determined by the rapid diminution of solar heat as the sun retreats to the south of the equator.

34. The above description will be found generally applicable, as far as it concerns the lower elevations, to the Ganges Working Circle, where the altitude varies from 1,000 to 4,500 feet, although there is one modifying circumstance which should be noted, *viz.*, the complete absence of the protecting Siwaliks, except for about eight miles from the Ganges, so that the forests are exposed to the full force of the hot winds from the plains, and it is therefore probable that the temperature is higher in the hot season than in most other parts of the Sub-Himálayas at similar elevation.

There are heavy dews throughout the cold season, especially on low ground, and frosts are not uncommon, being especially severe on the low-lying ground bordering on the Ganges.

The rainfall probably varies between that of Hardwár on the one hand and that of Naini Tal on the other, *i.e.*, between 45 and 90 inches, and it is probably greatest towards the upper forest boundary.

During the rains, and especially just after they have ceased, the forests are malarious, and last October and November many people died of fever.

At other times it is fairly healthy, although the impure water which is alone procurable in the hot weather, save near the Ganges, combines with the great heat in promoting dysentery and other diseases.

CHAPTER V.

THE STOCK.

35. For a fairly complete list of plants which are likely to occur in the Working Circle, the list of Garhwál plants, published in the North-Western Provinces Gazetteer, should be referred to; but for our purpose the following short list of the commonest, and from a forester's point of view the most important, plants should suffice :—

Order.	Scientific name.	Vernacular name.		Localities.
Bixineæ ...	Flacourtia Ramontchi ...	Kandai ...	S.	Open forest in warm places.
Ditto ...	Xylosma longifolium ...	Katari ...	S.	Rare.
Tamariscineæ ...	Tamarix gallica ...	Jhau ...	S.	Along the banks of some streams, *e.g.*, the Bedsani.
Ditto ...	Ditto dioica ...	Ditto ...	S.	
Ternstræmiaceæ	Saurauja nepalensis ..	Gogana ...	S.	Rare.
Dipterocarpeæ .	**SHOREA ROBUSTA** ...	Sál ...	T.	Abundant on well-drained plateaux and chaors and on northern slopes.
Malvaceæ ..	**Kydia calycina** ...	Pula ...	T.	Common.
Ditto ...	**Bombax malabaricum** ...	Semal ...	T.	Common on level and indifferently-drained land, as in the scattered grass and kokat lands adjoining the Ganges.
Sterculiaceæ .	**Sterculia urens** ...	Katira ...	T.	On some of the dry rocky hills as on the south slopes, Dogadda 3.
Ditto ...	" **villosa** ..	Udyal ...	T.	
Ditto ...	**Helicteres Isora** ...	Marorphal ...	S.	Common, especially in Kauria chaur.
Tiliaceæ ...	**Grewia oppositifolia** ...	Bhekla bhengal,	T.	Common in places.
Ditto ...	" **lævigata** ...	Bhimal ...	T.	Ditto.
Ditto ...	" **polygama** ...	...	S.	Ditto.
Lineæ ...	Reinwardtia trigynia ...	Pyura ...	S.	Common in damp shady places along the high precipitous banks of streams, &c.
Malphigiaceæ ...	Hiptage Madablota ...	...	C.	In some damp shady places.
Rutaceæ .	Glycosmis pentaphylla ...	Potla ..	S.	Occasionally forming undergrowth on low ground under shady trees.
Ditto ...	Murraya exotica ...	Juti ...	S.	Common in places.
Ditto	" kœnigii ...	Gani ..	S.	Ditto.
	Ægle Marmelos ...	Bel ...	T.	Common in places on low level ground, as in Kunau 6 and 7, Luni 5, and Rawasan 7.
Burseraceæ ...	Boswellia serrata ...	Salaia Guggar...	T.	On a few dry rocky hills with Sterculia.
Ditto ...	Garuga pinnata ...	Kharpat ...	T.	Fairly common at the foot of the hills.
Meliaceæ ...	**CEDRELA TOONA** ...	Tún ...	T.	Rare; on good soils in a few damp shady valleys only.
Rhamnaceæ .	**Zizyphus nummularia** ..	Ber ...	S.	Forming thickets or scattered on low ground.
Ditto ..	" **vulgaris** ...	" ...	S.	Ditto ditto.
Ditto ...	" **xylopyrus** ...	Kat-ber ..	S.	Forming thickets and scattered on some poorly stocked warm slopes. Common in places only.
Ampelideæ .	Vitis repanda ...	...	C.	Ditto ditto.
Ditto ..	" latifolia ...	...	C.	Ditto ditto.
Ditto ...	" carnosa .	...	C.	
Sapindaceæ ...	**SCHLEICHERA TRIJUGA.**	Kusum .	T.	Abundant on S.-W.-S. and S.-E. slopes, specially on clayey soil as in Kunau 1, Amgadi 3, and Gewai 1.
Anacardiaceæ .	**Rhus Cetinus** ...	Tung-ami ...	S.	In places only at high elevations as in Bedasni 2.
Ditto	" **parviflora** ...	Ranel ...	S.	Ditto ditto.
Ditto ...	Odina Wodier ...	Jhinghan ...	T.	Common, especially in open grassy places.
Ditto ...	**Semecarpus Anacardium,**	Bhilawa ...	T.	Commonly mixed with sál and kat-bilawa.
Ditto ...	**Buchanania latifolia** ...	Kat-bhilawa ...	T.	Common, especially on dry stony hills and often mixed with sál.
Ditto ...	Spondias mangifera ..	Amra ..	T.	Scattered chiefly on low-lying ground.
Coriariaceæ ...	Coriaria nepalensis ..	Mansuri ..	S.	Occasionally found towards the upper boundary.
Moringeæ .	**Moringa pterygosperma,**	Soanjna ...	...	Along the banks of streams on alluvial deposits, frequently associated with sissoo as along the Bheng, Luni and Sogaddi.
Leguminosæ ..	Crotalaria, Sp. ...	Gungri ...	H. or S	Common.
Ditto .	Indigofera, Sp. ...	Sakina ..	S.	Common; forming dense undergrowth in places along the upper boundary.
Ditto ..	**Millettia auriculata** ..	Goj	C.	Very abundant.
Ditto ..	**OUGEINIA DALBERGIOIDES.**	Sandan ...	T.	Abundant; especially on hot dry slopes.

Order.	Scientific name.	Vernacular name.		Localities.
Leguminosæ ...	Abrus precatorius ...	Rahti ...	C.	Not uncommon in some valleys
Ditto ...	**Erythrina suberosa** ...	Doldhak ...	T.	Common in certain clayey soils, as in Mundhal 6 and Kunau 1.
Ditto ...	Pueraria tuberosa ...	Bilai-kand ...	C.	Common.
Ditto ...	**Butea Frondosa** ...	Dhak ...	T.	Common towards the plains on flat ground, *e.g.*, Sigadi 4.
Ditto ...	Flemingia strobolifera ...	...	H.	Common.
Ditto ...	**DALBERGIA SISSOO** ...	Shisham ...	T.	Abundant along the courses of the main streams on recent alluvial deposits.
Ditto ...	**Cassia Fistula** ...	**Amaltas** ...	T.	Common; especially on low clayey soils.
Ditto ...	**Bauhinia racemosa** ...	**Kachnal** ...	T.	Common.
Ditto ...	" **retusa** ...	Semla ...	T.	Rare; but abundant close to the main ridge in Bedasni 6 at 4,000 feet.
Ditto ...	" **malabarica** ...	Amli ...	T.	Not uncommon in sál forest
Ditto ...	" **purpurea** ...	Khairwal ...	T.	Common.
Ditto ...	" **Vahlii** ...	Maljan ...	C.	Common; especially in mixed sál forest.
Ditto ...	" **variegata** ...	Kachnar ...	T.	Common.
Ditto ...	Mimosa rubicaulis ...	Agla ...	S.	Ditto. ...
Ditto ...	Acacia eburnea ...	Bhes ...	S.	Common on dry, exposed, precipitous slopes.
Ditto ...	" **CATECHU** ...	Khair ...	T.	With shisham along the streams and also scattered on hilly ground as in Mundhal 1.
Ditto ...	" Intsia ...	Katra ...	C.	
Ditto ...	Albizzia Lebbek ...	Kala siris ...	T.	Not found in any great abundance.
Ditto ...	" odoratissima ...	Siris ...	T.	Ditto ditto.
Ditto ...	" procera ...	Safed siris ...	T.	Ditto ditto.
Combretaceæ ...	**Terminalia belerica** ...	Bahera ...	T.	Common in open kokat forest as in Sigadi 4, 5 and 13, and Kunau 2.
Ditto ...	" Chebula ...	Harra ...	T.	Not common.
Ditto ...	" **tomentosa**...	Sain ...	T.	Abundant; especially on clayey soil and along the upper boundary.
Ditto ...	**ANOGEISUS LATIFOLIA.**	Bakli ...	T.	Abundant in the hilly parts, especially on slopes facing S. and S. E.
Myrtaceæ ...	Eugenia operculata ...	Paiman ...	T.	In damp, cool places.
Ditto ...	" **JAMBOLANA**...	Jaman ...	T.	Common in valleys along water-courses, especially in the E. part of the forests.
Ditto ...	**Careya arborea** ...	Kumbi ...	T.	Scattered in mixed sál forests; common in Sigadi 20.
Lythraceæ ...	Woodfordia floribunda ...	Dhai ...	S.	On warm, steep hillsides.
Ditto ...	**Lagerstrœmia parviflora.**	Dhaura ...	T.	Abundant; especially on badly-drained clayey soil.
Samydaceæ ...	Casearia graveolens ...	Chila ...	S.	Rare.
Ditto ...	" tomentosa ..	" ...	T.	Common; especially in the low-lying kokat forests.
Rubiaceæ ...	**ADINA CORDIFOLIA,**	Haldu ...	T.	Abundant in places along the foot of the hills.
Ditto ...	**Stephegyne parvifolia**...	Kaim ...	T.	Abundant as in Sigadi 20.
	Hymenodictyon excelsum ...	Bhalena ...	T.	Scattered in low-lying kokat forests and along the base of the hills.
Ditto ...	Wendlandia exserta ...	Chilkya ...	T.	Common in some of the broken raviny ground, as the Dehli ghâti.
Ditto ...	Gardenia turgida ...	Thanella ...	T. or S.	On poor, hot, moderate slopes, as in Mundhal 6.
Ditto ...	Randia tetrasperma ...	Bhotiya gingaro.	S.	Common on clayey soil with warm aspect.
Ditto ...	" dumetorum ...	Mainphal ...	S.	Ditto ditto.
Ebenaceæ ...	**DIOSPYROS** ...	Tendu ...	T.	Abundant on hilly ground, especially on exposed slopes with clayey soil.
Oleaceæ ...	Nyctanthes arbortristis ...	Parijat: Harsinghar of plains.	S.	Found on dry stony hills, especially near ridges.
Apocynaceæ ...	Carissa spinarum ...	Karaunda ...	C.	Common; frequently associated with ber in kokat forest.
Ditto ...	Vallaris Heynei ...	Dudhi ...	T.	Common.
Ditto ...	**Wrightia tomentosa** ...	Darhela ...	T.	Common in kokat forest with Holarrhena.
Ditto ...	Alstonia scholaris ...	...	T.	Very rare: a fine tree in Jaunk Khera close to the Ganges.
Ditto ...	**Holarrhena antidysenterica.**	Kura, Dhudi ...	T.	Common in kokat forest and scattered in mixed sál forest.
Ditto ...	Ichnocarpus frutescens ...	Dudhi ...	C.	Common.
Asclepiadeæ ...	Calotropis gigantea ...	Madar ...	S.	In dry, waste, sandy places.

Order.	Scientific name.	Vernacular name.		Localities.
Boraginaceæ ...	Ehretia serrata ...	Panya ...	T.	Common in Kunau 3, 4, 5 & 6, and in low ground associated with khair in a few places.
Ditto ...	„ lævis ...	Kodah ...	T.	
Convolvulaceæ ...	Cuscuta reflexa ...	(Dodder) ...	P.	On ber bushes, &c.
Bignoniaceæ ...	Oroxylum indicum ...	Phar-Kathsellu,	T.	Not very common.
Ditto ...	Stereospermum suaveolens...	Padal ...	T.	Scattered in various kinds of forests.
Acanthaceæ ...	Adhatoda vasica ...	Bashang ...	S.	Forms undergrowth under shishams, khair, ber, &c.
Verbenaceæ ...	Gmelina arborea ...	Kumar ...	T.	Rare.
Ditto ...	Vitex vegundo ...	Shiwali ...	S.	Common in places.
Ditto ..	Holmskioldia sanguinea ...	Kullolia ...	S.	Ditto.
Amarantaceæ ...	Deeringia celosioides ...	Kalalohari ...	C.	Ditto.
Polygonaceæ ...	Polygonum sp. ...	...	H.	Common in damp places.
Loranthaceæ ...	Loranthus vestitus ...	Banda ...	P.	Rather rare.
Ditto ...	„ longiflorus ...	„ ...	P.	Very common on numerous different trees.
Euphorbiaceæ ...	Trewia nudiflora ...	Bhillaura or Khamara.	T.	Along banks of some rivers.
Ditto ...	Phyllanthus nepalensis ...	Bairmao ...	T.	Common in places, especially near upper forest boundary, *e g.*, Bedasni 6.
Ditto ...	„ Emblica ...	Aonla ...	T.	Common in places, especially on moderate S slopes with binding soil, as in Mundhal 11.
Ditto ...	Putranjiva Roxburghii ...	Putrajiva ...	T.	Rare; in low, shady, mixed forest as Jamnia Bagh.
Ditto ...	Briedelia montana ...	Karualiya ...	T.	Pretty common.
Ditto ...	„ retusa ...	Khaja ...	T.	Ditto.
Ditto ...	Mallotus phillipinensis ...	Rauni ...	S.	Abundant in kokat forests.
Ulmaceæ ...	Ulmus integrifolia ...	Papri, Kanju ...	T.	Some fine but very scattered trees in kokat forest on sandy, alluvial soil.
Ditto ...	Sponia politoria ...	Khaksi ...	S.	Not uncommon in places.
Moraceæ ...	Ficus indica ...	Bargat ...	T.	Common on low ground, especially in kokat forest.
Ditto ...	„ infectoria ..	Pakar ...	T.	Not common in similar places.
Ditto ...	„ religiosa ...	Pipal ...	T.	Common.
Ditto ...	„ cordifolia ...	„ ...	T.	Ditto.
Ditto ...	„ Cunia ...	Jherphal ...	T.	Common along ravines and watercourses.
Ditto ...	„ glomerata ...	Gular ...	T.	Ditto ditto.
Ditto ...	„ hispida ...	Totmila ...	T.	Ditto ditto.
Artocarpeæ ...	Cudrania javanensis ...	Manda ...	S.	Common in a few places.
Urticaceæ ...	Boehmeria rugulosa ...	Gainti ...	T.	Common near upper forest boundary.
Ditto ...	„ macrophylla ...	Sochalagolka ...	S.	Ditto ditto.
Ditto ...	„ platyphylla ...	Gargela ..	S.	Ditto ditto.
Ditto ...	Debregeasia bicolor ...	Tushyari ...	S.	Ditto ditto.
Salicaceæ ...	Salix tetrasperma ...	Garbains ...	T.	On river banks and other moist places.
Coniferæ ...	Pinus longifolia ...	Chír ...	T.	Frequent along the upper boundary and on the high ridges.
Cupuliferæ ...	Quercus incana ...	Bánj ...	T.	Only on the highest points at 4,000 or over, as in Bedasni 6.
Juglandeæ ...	Engelhardtia Colebrookiana,	Mowa ...	T.	Ditto ditto.
Palmaceæ ...	Phœnix sylvestris ...	Khajur ...	...	Not uncommon.
Ditto ...	„ acaulis ..	Takal ...	...	Occasionally on very stony slopes.
Smilaceæ ...	Smilax, Sp. ...	Kukardhara ...	C.	Common occasionally.
Dioscoreæ ...	Dioscorea Sp. .	...	C.	Frequent.
Gramineæ ...	Cynodon dactylon .	Dúb ...	H.	Very common.
Ditto ...	Saccharum munja ...	Munj ...	H.	Ditto.
Ditto ...	Dendrocalmus strictus ...	Báns ...	...	Ditto.
Ditto ...	Erianthus olivaceus ...	Káns ...	H.	Ditto.
Ditto ..	Spodiopogon angustifolius...	Babar ...	H.	Ditto on clayey soil.
Cyperaceæ ...	Eriophorum comosum ...			On warm aspects.

In this list T. stands for tree.

Ditto S. ditto shrub.

Ditto C. ditto climber.

Ditto P. ditto parasite.

Ditto H. ditto herb.

The species whose scientific names are printed in large thick type are the most important of all, and have been enumerated separately in the plots valued, whilst all other trees have been included under the term kokat (miscellaneous trees). The kokat which have been especially mentioned in the description of compartments are shown in small thick type and all other species in ordinary type.

36. The different kinds of trees are so irregularly distributed throughout the forest, and the stock varies so much even over limited areas and on the same hillside, that it has been found most difficult to form a correct estimate of their contents. An attempt has, however, been made to show the main characteristics of the Working Circle by means of a stock map, but it must be understood that this has no pretension to accuracy as regards minute details, for it would be simply impossible to depict the frequent and sometimes gradual changes on the same slopes. The map was prepared with the aid of the results of the valuation of numerous well-distributed plots combined with the description of compartments, but it is regrettable that, as it was not intended at first to prepare such a map, the boundaries of the different kinds of forest were not sketched in on the spot.

The following summarizes the results for the whole working circle :—

1	2	3	4
		No. of acres.	
1	Sál and kokat	12,638	
2	Sál, kokat and sain	5,468	
3	Sál, kokat and bakli	549	
4	Sál, kokat, sain and bakli	1,762	
5	Sain, kokat and sál	1,438	(including 195 acres without sál).
6	Sain, kokat and bakli	1,116	(295 acres with some sál).
7	Bakli and kokat	576	
8	Bakli, kokat and sál	572	
9	Bakli, kokat and gosam	650	
10	Bakli, kokat, sain and gosam	400	(50 acres without gosam).
11	Kokat	20,807	
12	Kokat and sál	7,772	
13	Kokat, sál and sain	588	
14	Kokat, sál and bakli	637	
15	Kokat, sál, bakli and sain	850	
16	Kokat and sain	754	
17	Kokat and bakli	12,587	
18	Kokat, bakli and sain	1,143	
19	Kokat, bakli and gosam	1,038	
20	Kokat and gosam	90	
21	Kokat, shisham and khair	611	(64 acres without shísham).
22	Shísham and khair	805	
23	Shísham, khair and kokat	679	
24	Kokat and grass	751	
25	Grass	1,759	
	Total ...	75,540	
	Excluded from valuation	14,856	
	Total ...	90,396	

Taking chír as 1, the following figures represent the relation between the different species, as far as their numbers are concerned :—

Kokat	... ...	402
Sál	... ...	197
Sandan	... ...	70
Bakli	... ...	56
Sain	... ...	54
Dhaura (L)	... ...	37
Gosam	... ...	17
Shisham	... ...	12
Khair	... ...	11
Tendu	... ...	10
Haldu	... ...	9
Jaman	... ...	8
Chír	... ...	1

Sál, sain, bakli, gosam, shísham, and khair and kokat are shown by washes of different colors, the color laid on being that of the species which occurs in greatest abundance, provided that it is half as strong numerically as the kokat, when it may be said to predominate. If, on the other hand, the number of kokat is more than double the number of any of the other species, burnt sienna, the color chosen for kokat, is laid on.

Lines of different colors and of fixed widths apart are then drawn over the wash, to represent the relative abundance of those species just mentioned, which may occur mixed with the predominant one. This may be best explained by one example, such, for instance, as a forest of sál with kokat, sain and bakli as auxiliary species; sál being predominant, the wash laid on will be green, and if the kokat amount in number to one-third the total number of trees or more, burnt sienna lines will be drawn across the green wash, the distance between the lines being $\frac{1}{12}$th of an inch; then supposing the number of sain equals $\frac{1}{4}$th the total number of trees, yellow lines will be drawn in a similar way but in a different direction from the burnt sienna ones and at distances apart of $\frac{1}{8}$th inch; and finally if the number of bakli equals $\frac{1}{10}$th total number of trees, carmine lines $\frac{2}{3}$rds of an inch apart will be drawn. The distance between the lines for any of the auxiliary species is thus determined by its abundance as compared with the total number of all the other kinds. Thus if the number of any auxiliary species equals $\frac{1}{3}$rd the total number of trees, the distance of its lines apart would be $\frac{1}{12}$th inch :—

If	$\frac{1}{2}$	...	...	...	...	...	...	...	$\frac{1}{8}$ Inches.
"	$\frac{1}{3}$	...	...	...	...	...	...	...	$\frac{1}{4}$ "
"	$\frac{1}{4}$	...	...	...	...	...	...	...	$\frac{1}{3}$ "
"	$\frac{1}{7}$	...	...	...	...	...	...	...	$\frac{5}{12}$ "
"	$\frac{1}{8}$	...	...	...	...	...	...	...	$\frac{1}{2}$ "
"	$\frac{1}{9}$	...	...	...	...	...	...	...	$\frac{7}{12}$ "
"	$\frac{1}{10}$	...	...	...	...	...	...	...	$\frac{2}{3}$ "

less than $\frac{1}{10}$ no lines are shown.

In Appendix A an estimate, necessarily very rough, is given of the number of acres of each kind of forest contained in each separate compartment and in each block, including only the area comprised in the valuation survey.

These figures prove how very much the stock varies. This variability is due to numerous causes, the more important being aspect and slope, altitude, soil and locality.

37. *Aspect and slope.*—As previously stated in the chapter on configuration, the main aspects are south and south-east, north and north-west.

The slopes facing south or south-east are, as a rule, very steep and precipitous, and form a very large portion of the 14,856 acres which have been excluded from the valuation survey as being inaccessible or unworkable. The stock generally consists of a poor, open, mixed forest of small inferior badly-grown kokat, bakli, and sandan, with occasionally a considerable number of sain, the latter species being especially common near the upper boundary on clayey ground; whilst bakli is finer and not unfrequently predominates on rather low, rugged ground facing the south-east and having a soil with a good deal of clay in its composition, as in Sigadi 20, Mundhal 8, and Kunau 1. Gosam also is usually found, but nowhere forms any large proportion of the stock.

Towards the ridges on stony ground, where the slope is not excessive, kat-bhilawa is the commonest species amongst kokat, and mixed with it where the soil is clayey there is often a large number of small tendu. Sál is rare at these aspects, but is occasionally met with in small numbers and is fairly abundant in Amgadi 1, on sandy

soil, and in Mundhal 10 mixed with kat-bhilawa. In addition to the species mentioned the following are also characteristic of these slopes:—

Sterculia urens.	Woodfordia floribunda.
Ditto villosa.	Nyctanthes arbor-tristis.
Boswellia serrata.	Pinus longifolia.
Acacia eburnea.	(on the higher parts).

Slopes facing the south-west are not very numerous, but those that do occur are somewhat similarly stocked to the slopes described above, gosam being perhaps commoner as a rule, as in Gewai 1, and Amgadi 3, whilst sál sometimes mixes in in fair numbers, as in Gwalgarh-Sigadi 21, and Mundhal 3.

On low moderate slopes at this aspect and having a stiff clayey soil as in Mundhal 4, we find a very poor and very open forest especially characterized by such species as:—

Zizyphus xylopyrus.	Carissa spinarum.
Cassia fistula.	Stereospermum suaveolens.
Randia dumetorum.	Phyllanthus Emblica.

and Bábar grass.

The slopes facing the north or north-west are generally much less precipitous than the ones just described, and in comparison are cool and moist. On the moderate open slopes with light soil there is usually a mixed forest of sál and kokat, the former not unfrequently predominating. Sain mixes in pretty freely towards the upper boundary, and there is usually a certain number of bakli and sandan. These slopes contain by far the best forests and the largest quantity of sál in the circle, if we except certain plateaux and chaurs mentioned hereafter.

The maljan and gauj climbers are often very abundant. Where the soil is clayey sál disappears and sain becomes more abundant, whilst on very moist clayey lands dhaura occurs instead of bakli. Where the ground is very precipitous, as is often the case along the upper forest boundary and immediately over the main streams, there is usually a poor kokat forest.

The larger portion of the Kunau and Bedasni blocks face the Ganges, have a westerly aspect, and are mainly stocked with kokat and bakli, but the latter is absent, or nearly so, from the chaurs.

Bedasni 1 and 2 may be given as examples of slopes with an easterly aspect. Here the stock consists chiefly of kokat and bakli, the latter often predominating; and there is in places a considerable quantity of gosam and sain. The soil is loamy with a good proportion of clay.

38. *Altitude.*—As previously stated, this varies from 1,000 to 4,500 feet, and we find a marked difference between the vegetation at the foot of the hills and on the higher ridges. A few characteristic species are given below on the understanding that the classification is not a rigid one:—

On low ground towards the plain.	At the foot of the hills.	At the higher elevation.
Bombax malabaricum ...	Adina cordifolia	Rhus Cotinus.
Ægle Marmelos	Staphegyne parvifolia ...	„ parviflora.
Odina Wodier	Hymenodictyon excelsum ...	Coriaria nepalensis.
Spondias Mangifera.	...	Bauhinia retusa.
Cassia Fistula.	...	Phyllanthus nepaleniss.
Butea frondosa.	...	Boehmeria rugulosa.
Careya arborea.	...	„ macrophylla.
Ehretia serrata.	...	„ platyphylla.
Casearia tomentosa.	...	Debregeasia bicolor.
		Quercus incana.
		Engelhardtia Colebrookiana.
		Pinus longifolia.

Sál ranges from the foot of the hills to the upper boundary, but does not occur on the highest points, although it ascends occasionally to at least 3,000 feet, where, however, it is usually of very inferior quality, remaining stunted and never attaining large dimensions.

39. *Soil.*—Much has been said regarding the influence of soil in the paragraph devoted to aspect, but it may be noted here that, irrespective of this cause, certain species are more or less abundant on clay or on sandy soil respectively :—

Species abundant on clay.	Species abundant on sandy soil.
Erythrina suberosa. Terminalia tomentosa. Lagerstrœmia parviflora. Randia dumetorum. Phyllanuths Emblica.	Shorea robusta. Semicarpus Anacardium. Buchanania latifolia. Ougeinia dalbergioides. Pinus longifolia.

40. *Locality.*—In addition to the influence on the distribution of plants of aspect, altitude and soil, most plants have special *stations* which they prefer to all others and are therefore not uniformly scattered over areas in which the first three conditions are identical. Thus some species are most common along the banks of streams, others are only found in damp shady valleys or in open grassy places and some only on recenty deposited alluvium. Within our working circle the following occur most frequently in the localities mentioned :—

Open grassy badly-drained ground.	Damp shady valleys.
Bombax malabaricum. Odina Wodier. Terminalia belerica.	Cedrela Toona. Eugenia Jambolana. Putranjiva Roxburghii.
On recent alluvial deposits along the rivers.	**Along the banks of streams.**
Dalbergia sissoo. Acacia catechu. Moringa pterygosperma.	Tamarix gallica. " dioica. Eugenia Jambolana. Trewia nudiflora. Ficus Cunia. " glomerata. Salix tetrasperma.

41. It will now be attempted to give a short account of the stock of the whole area by summarizing the description of the stock contained in each block.

South of the Bheng nadi on the precipitous and often inaccessible ground along the upper forest boundary there is usually a poor open mixed forest of kokat (such as kat-bhilawa) sain, sandan, bakli, together with gosam in varying proportions; whilst frequently on the gentler slopes possessing favorable aspects there is a fair proportion of badly-grown sál.

East of the Rawasan sain is very abundant and poor open mixed sál forest often reaches the upper boundary, whilst some chír is generally found on the higher ridges.

42. On the lower hills between the Kho nadi and the Mitawali sot there is, on favorable aspects, usually a mixed forest of sál and kokat (such as kat-bhilawa, &c.,) the latter often having a considerable predominance, but where the slope is not too great, there is not unfrequently a pole forest of sál and sain mixed with kokat.

The sál and sain are usually crooked and of inferior quality, large trees being rare.

Sál does not occur on the clay, but sain is more abundant. The Sukrau block contains the best piece of sál in this part of the forest. On the steeper slopes, especially

those facing south, there is generally an open mixed forest of kokat together with variable proportions of bakli, sain, sandan, &c. Tendu is fairly common in many places on clay.

The level ground along the foot of the hills is stocked with an open forest consisting almost entirely of kokat, such as ber, bauhinia, dhak, semal, bahera, rauni, pula, chilla, bel, amaltas, saonjna, grewia sp., &c., with some bakli, khair and haldu often interrupted by more or less extensive blanks covered with grass. There is a good deal of shisham along the Luni and Mitawali sots, and in the old Papidanda closed block there are many patches of young shisham, khair, saonjna, &c, the growth of the khair being particularly vigorous On two raised flats aggregating 370 acres in the Luni block there are two of the finest sál pole forests in the whole district.

43. West of the Mitawali sot are the three fire-protected blocks of Jogichaur, Kauriachaur and Andermajhera, the two former containing a sál forest mixed with kokat and sometimes with bakli The sál is chiefly in the shape of poles, but there are some old, hollow and useless large trees.

In the northern half of Kauriachaur, however, there are only scatterred kokat with large open grassy blanks. Dudli maidan adjoining this chaur and portions of the Andermajhera closed block also contain some good sál, but over the greater part of the hills mixed forest prevails, containing kokat, sandan, bakli, sain, a few sál, and on clayey soil a good proportion of dhaura.

On southerly aspects the forest is usually very poor and open, as, for example, on the hills south of the Mundhal nadi.

On the flat land bordering the Ganges there is either nothing but grass or grass with scattered kokat, or a fair kokat and dhaura forest, as in the Andermajhera block, where there are also some fine bel.

In the valleys of the Mundhal, Dogadda, and Bheng, and on the islands in the Ganges, there are many valuable patches of shisham and some khair, separated from each other by stretches of grass, &c. ; in the Bheng nadi saonjna occur mixed with them in large numbers.

North of the Bheng there is scarcely any sál worth mentioning, the predominating type of forest being a mixed one of kokat and bakli, the latter being particularly numerous in the southern part of the Bedasni block, and in many places near the boundary between the Bedasni and Kunau blocks.

44. *Quality*—West of the Rawasan the quality of sál is generally inferior, varying from 3 to 5, but in Kauriachaur it rises to 6 and in Jogichaur in Luni 6 and on the Dudli maidan in the Dogadda block to 8 for the young poles. On the whole, east of the Rawasan the quality improves, varying generally between 3 and 6, although for the old trees it is only 2 to 3.

The quality of sain in workable places is 4 or 5 rising to 8 in the northern part of the Gwalgarh block.

The quality of bakli in the Bedasni and Kunau blocks varies between 3 and 6, but over the greater part of the forests it is not above 3.

Kokat presents every possible variation in quality from 1 on the steeper slopes to 10 on a few of the most fertile portions of the level tracts adjoining the hills.

On the chaurs north of the Bheng only trees of very wretched quality remain, all the straightest poles having been felled for the headworks of the Ganges Canal.

There are scarcely any good sandan or tendu trees in the whole of these forests and the bakli is never of any great size. Much of the shisham and khair is very good, but the trees are nearly all too young for export.

The haldu grows to a large size, but as is usually the case with this species, an enormous percentage of the older trees is hollow.

There is some fair jaman in the eastern part of the forests.

45. *Density.*—In the mixed sál forest on the more moderate slopes, the density in the eastern part of the Working Circle is generally between 4 and 8, and in the western portion between 4 and 6. In the Jogi chaor block, however, it varies from 2 in the open parts to 10 in places in the sál pole forest, and in the Kauria chaor block it varies from 1 to 6.

In the open mixed forest on precipitous ground and on southern slopes it is much less, generally varying from 2 to 5, but sometimes rising to 8 or 9, as in some of the southern portions of the Bedasni and Kunau blocks or descending to 1, as over portions of the compartments south of the Mundhal, and in places on the chaors of the Kunau block, which appear to have been both over-cut and over-grazed.

The density of the forest in general would no doubt be greatly benefited by continuous fire-protection, and perhaps also by restrictions on grazing where this appears to be excessive, which is only very rarely the case.

The average density of the forest as far as trees 6 inches in diameter and above are concerned is shown in the table which follows. This table shows the great deficiency in large trees and the open nature of the forest as a whole :—

Number per acre.

	Sál.	Sain.	Haldu.	Bakli.	Dhaura.	Gosam.	Shisham.	Khair.	Jaman.	Sandan.	Tendu.	Chir.	Kokat.	Total.
I. Class ...	·19	·24	·1	·18	·04	·04	*Nil.*	*Nil.*	·03	*Nil.*	*Nil.*	·01	·52	1·35
II. „ ...	·48	·37	0·9	·39	·12	·08	·01	*Nil.*	·04	·02	*Nil.*	·01	·96	2·57
III. „ ...	2·37	·96	·18	·96	·37	·28	·08	·03	·13	·37	·07	·02	5·15	10·97
IV. „ ...	13·17	2·02	·21	2·18	1·91	·72	·72	·67	·23	4·4	·6	·02	28·5	55·35
	16·21	3·59	·58	3·71	2·44	1·12	·81	·7	·43	4·79	·67	·06	35·13	70·24

46. *Reproduction.*—In the mixed sál forests of the Sukrau, Andermajhera, Jogi chaor and Kauria chaor blocks, which are fire-protected, there is usually good reproduction of sál and occasionally of kokat, but in the portion of Kauria chaor stocked with kokat there appear to be very few seedlings, which is probably due in some places to the high grass and in others to the dense undergrowth of bushes.

In the open forests reproduction has been very much checked or entirely destroyed by fires, aided sometimes by excessive grazing and sometimes by a dense growth of climbers.

In the hollows and other places which often escape burning, reproduction is much better, and there is often a fairly abundant advanced growth of sál, sain and kokat, especially of kat-bhilawa.

In the Mundhal, Bedasni and Kunau blocks reproduction is particularly unsatisfactory, being often less than 1.

The botanical description and in addition much valuable information concerning all the different trees found in these forests will be found in the "Forest Flora of North West and Central India" by Brandis, whilst in Gamble's "Manual of Indian Timbers" will be found excellent descriptions of their timber, and here it will only be attempted to notice, for each of the more important species, its special characteristics in these forests.

47. *Sál* (*Shorea robusta*)—Sál is found irregularly distributed over the whole of the working circle from the foot of the hills to 3,000 feet in elevation, and sometimes even above that altitude.

The extreme irregularity of its distribution renders it very difficult to estimate with anything approaching exactitude the area containing sál, but with this admission these forests may be thus divided :—

		Acres.
I.	Sál and kokat	12,688
	Sál, kokat and sain	5,468
	Sál, kokat and bakli	549
	Sál, kokat, sain and bakli	1,702
	Total area over which sál predominates ...	20,417
II.	Sain, kokat and sál	1,243
	Bakli, kokat and sál	572
	Kokat and sál	7,772
	Kokat, sain and sál	588
	Kokat, bakli and sál	637
	Kokat, sain, bakli and sál	850
	Total area in which sál, although not predominant, occurs mixed with other species.	11,662
	Grand Total of sál-containing area ...	32,079

These areas are chiefly on gentle or moderate but not precipitous slopes, having northerly and north-westerly aspects with a light sandy or loamy soil, and on chaors and raised plateaux at the base of the hills ; some of the sál areas of No. II. have, however, southerly aspects, especially those containing much bakli.

The sál, particularly on the more hilly parts, is of inferior quality, being of small girth, very short in the bole, and usually very crooked.

About 10 feet of light loamy soil is considered sufficient for good poles of sál, and this we only find on the alluvial soils of the chaors and plateaux.

The most valuable sál forests are therefore—

Range.	Name of block or compartment.	Sál predominant.	Sál not predominant but mixed with other species.
		Acres.	Acres.
Gori	Kauria chaor	700	355
	Dogadda 2	305	...
	Ander Majhera 1 (Dudli Maidan) (part of plateau)...	138	64
	Jogi chaor	681	...
	Luni 5	103	43
	Luni 6	225	...
Udepur ...	Sukrau	735	269
	Gwalgarh 2, 3, 4	1,012	398
	Total ...	3,899	1,129

The last forest is on hilly ground with slopes of often only 20°, but in places precipitous.

These sál forests do not contain many large trees at present, as they had been heavily worked before the advent of the Forest Department, so much so that all the timber for the Chila rest-house had to be brought from the Garhwál Division, but the growth of the poles in them is very good, and there is no reason to believe but that many of them will attain a large size.

The Kauria and Jogi chaors and the Sukrau block, which are all fire-protected, contain numerous tall, straight, well-grown sál poles, and also some old hollow trees, valueless as timber, but useful as seed bearers.

In Dogadda 2 on the Dudli Maidan, which is really a continuation of the Kauria forest, there are a very large number of promising young saplings, and the same may be said of a portion of the plateau in Andermajhera 1, where the sál is almost pure. In Luni 5 and 6 there are two isolated non-fire-protected patches of good sál forest on raised flats containing about 370 acres, consisting of rather well-grown young poles, frequently from 60 to 100 feet high and of quality varying from 7 to 8. In Gwalgarh 2, 3 and 4 sál predominates on the moderate slopes and frequently forms a pole forest on the alluvium, of quality varying from 4 to 6 and density from 6 to 8 as regards sál.

The following is an estimate of their contents based on the results of the valuation survey :—

	Block or compartment.	Sál-containing area in acres.	IV. class.	III. class.		II. class.		I. class.		Total.	Number of sál trees per acre.
				Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.		
Goel.	Kauria chaor ...	1,055	52,555	4,621	249	608	80	143	403	58,659	55
	Dogadda 2 (Dudli Maidan.)	305	11,322	1,447	252	503	169	223	119	14,035	46
	Andermajhera (part of plateau.)	202	7,164	1,740	...	170	...	19	...	9,093	45
	Jogi chaor ...	681	9,833	1,671	196	976	244	505	256	13,681	21
	Luni 5 ...	146	4,453	776	35	102	10	25	...	5,401	37
	Luni 6 ...	225	5,078	2,493	144	535	91	113	38	8,492	38
Udepur.	Sukrau ...	1,004	26,420	8,257	685	1,152	688	426	330	37,958	38
	Gwalgarh 2, 3, 4 ...	1,410	42,903	8,568	656	1,212	402	370	260	54,371	39
	Total for the best forests.	5,028	150,728	29,573	2,217	5,258	1,684	1,824	1,406	201,690	40
Remaining Forests.	Sigaddi 10, 11, 12 ...	1,931	56,977	6,546	578	1,717	410	213	128	66,569	34
	Gori accessible ...	8,366	133,208	26,811	6,273	5,758	3,413	1,947	2,564	179,974	21
	Udepur accessible ...	6,667	181,403	34,299	2,300	5,507	1,392	1,515	815	227,231	34
	Gori inaccessible ...	3,697	63,205	21,454	1,940	2,901	890	512	270	91,172	25
	Udepur inaccessible,	6,390	133,220	32,728	2,699	3,373	1,470	1,325	810	175,625	27
	Grand Total ...	32,079	727,741	151,411	16,007	24,514	9,259	7,336	5,993	942,261	29

In the best sál forests therefore the number of sál to the acre is—

Young sál (III. and IV. classes)	38
Old sál (I. and II. classes)	2
Total ...	40

whilst in the other sál forests the number is—

Young sál (III. and IV. classes)	26·0
Old sál (I. and II. classes)	1·4
Total ...	27·4

In the Patli Dún forests valued by Mr. Dansey the results were in the three Divisions :—

	Division I.	Division II.	Division III.
Young sál	21·4	22·14	36·59
Old sál	5·23	6·07	8·34
Total ...	26·26	28·21	44·93

Thus as far as numbers are concerned the best Ganges forests compare favorably with the Patli Dún, as regards the younger classes, but very unfavorably as regards the mature stock.

Of the I. class nearly one-half and of the II. class nearly one-third of the trees are unsound.

48. *Sain (Terminalia tomentosa).*—Sain is found in almost every compartment of the Working Circle, attaining its finest dimensions where it is mixed with sál on the chaors and plateaux. Unlike the latter species, it can thrive on clayey soil, and in these forests where the soil is too stiff or too badly drained for sál, sain is generally common, whilst in the best sál forests, first enumerated, the proportion between the two species is only 1 to 16, rising in Gwalgarh 2, 3, and 4 to as much as 1 to 5.

This species is very abundant along the northern boundary even on the most precipitous ground and at the most unfavorable aspects, where it often predominates; but here it is very stunted and never attains any great size or even useful dimensions.

The following is an estimate of the area containing sain :—

	Acres.
Sain, kokat and sál	1,438
Sain, kokat and bakli	1,116
Area over which sain predominates ...	2,554
Sál, kokat and sain	5,468
Sál, kokat, sain and bakli	1,762
Bakli, kokat, sain and gosam	400
Kokat, sál and sain	588
Kokat, sál, bakli and sain	850
Kokat and sain	754
Kokat, bakli and sain	1,143
Area over which sain occurs although not predominant ...	10,965
Total, sain producing ...	13,519

The compartment containing the largest number of I. class sain are Satti Khala 2, Malan 2, Rawasan 5 and 6, Luni 3, Amgadi 2, Dogadda 1 and Bedasni 6.

In the Sukrau, Jogi chaor, Andermajhera, Kauria chaor, Bedasni and Kunau blocks sain never equals $\frac{1}{10}$th of the total stock.

The valuation survey gives the following results :—

	IV. CLASS.	III. CLASS.		II. CLASS.		I. CLASS.		TOTAL.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
GOGI. Kauria chaor ...	4	...	...	...	...	...	...	4
GOGI. Dogadda 2 (Dudli Maidan.)	86	49	...	68	...	49	12	264
GOGI. Andermajhera plateau.	...	...	...	...	...	...	...	...
GOGI. Jogi chaor ...	735	300	...	16	...	109	...	1,160
GOGI. Luni 5 and 6 ...	141	67	...	7	...	3	...	218
UDEPUR. Sukrau (on part)	46	15	.	7	7	49	...	124
UDEPUR. Gwalgarh 2, 3 and 4,	7,511	2,116	20	534	49	335	36	10,601
Total for the best sal forests.	8,523	2,547	20	632	56	545	48	12,371
Sigadi 10, 11, 12 ...	5,390	1,148	60	526	30	69	15	7,238
REMAINDER OF THE WORKING CIRCLE :—								
Udepur accessible . .	20,627	8,263	291	3,356	112	2,409	274	35,332
Gori accessible ...	21,517	10,601	426	4,901	419	2,765	441	41,070
Udepur inaccessible,	60,013	27,058	1.140	9,708	655	6,285	622	1,05,481
Gori inaccessible ...	26,983	15,334	1,155	5,712	346	3,165	423	53,118
Total ...	143,053	64,951	3,092	24,835	1,618	15,238	1,828	254,610

The proportion of young sain (classes IV. and III) to old is therefore as 4·85 to 1, but much of the young sain will never reach larger dimensions, owing to the nature of the ground on which they grow.

49. *Haldu* (*Adina cordifolia*).—The haldu nowhere forms a large portion of the stock, scarcely ever numbering $\frac{1}{\quad}$th of the total number of trees. It is most abundant along the foot of the hills on the first slopes rising from the level ground where it receives plenty of light, especially in Gewai 1 and 2, Sattikhala 2, Malan 1, Gwalgarh 1, 2, 3 and 4, Sigaddi 20 and 21, Luni 5, Mundhal 7, Bedasni 5, and Kunau 1 and 3. It is also common in Laldhang 5, Malan 2, Rawasan 5, Amgadi 2 and 3, and Bedasni 1 and 2. It is generally mixed with kaim, amaltas, chilla, rauni, kumbhi and bamboos.

	IV. Class.	*III. Class.*		*II. Class.*		*I. Class.*		Total
		Sound	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	4,445	3,507	1,038	1,403	742	1,172	2,012	14,319
Gori ditto ...	6,193	3,389	923	2,006	850	1,131	1,740	16,232
Udepur inaccessible ...	2,639	2,371	773	738	579	447	733	8,280
Gori ditto ...	1,255	305	130	235	40	35	87	2,087
Total ...	14,532	9,572	2,864	4,382	2,211	2,785	4,572	40,918

The proportion of young trees to old is therefore as 1·93 to 1, which is a very unsatisfactory ratio, and it should be noticed that nearly one-half of the old trees are unsound. The lack of young haldu is noticeable throughout the Bhábar, and if this is due, as is not perhaps improbable, to some change in the climate, &c., which has affected its reproductive powers, we may expect this valuable species to disappear in course of time.

50. *Bakli* (*Anogeissus latifolia*).—This species is very abundant on hilly ground throughout the forest, especially on steep hill-sides facing south and forms part of the stock of the poor open mixed forest over a large portion of the 14,856 acres which have been excluded from the valuation survey as being inaccessible or unworkable.

It attains a large size and not unfrequently predominates on rather low rugged ground facing the south-east and having a soil with a good deal of clay in its composition as in Sigadi 20, Mundhal 8, and Kunau 1.

The bakli-containing area, which has been included in the survey, is estimated as follows :—

	Acres.
Bakli and kokat	576
Bakli, kokat and sál	572
Bakli, kokat and gosam	650
Bakli, kokat, sain and gosam	400
Area over which bakli predominates ...	2,198
Sál, kokat and bakli	549
Sál, kokat, sain and bakli	1,762
Sain, kokat and bakli	1,116
Kokat, sál and bakli	637
Kokat, sal, bakli and sain	850
Kokat and bakli	12,587
Kokat, bakli and sain	1,143
Kokat, bakli and gosam	1,038
Area over which bakli occurs but does not predominate ...	19,682
Total, bakli producing area ...	21,880

The following summarizes the contents of the Working Circle for this species :—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	24,370	10,605	1,858	4,589	1,170	1,798	966	45,356
Gori ditto	80,046	34,977	4,800	14,254	3,500	5,677	3,136	146,390
Udepur inaccessible ...	24,439	7,603	1,519	1,819	465	581	198	46,624
Gori ditto	15,354	5,740	890	1,663	436	282	112	24,477
Total ...	154,209	58,925	9,067	22,325	5,571	8,338	4,412	262,847

The proportion of small trees (III. and IV. classes) to large is therefore as 5 and 4 to 1; but it should be noted that a very large number of the former consist of stunted trees which have already arrived at maturity, and will never become first class ones.

One-fourth of the second class and one-third of the first class trees are unsound.

The compartments containing the largest number of mature bakli are—

Sigadi 6, 20; Luni 11 ; Mundhal 7.

Dogadda 4 ; Bedasni 1, 5, 6 ; Kunau 1, 3, 4, 5, 7.

51. *Dhaura* (*Lagerstrœmia parviflora*).—This tree is sometimes called bakli and the preceding species (*Anogeissus latifolia*) dhaura ; so it is possible, owing to this, that some errors have been made in the valuation survey, the enumerator jotting down bakli instead of dhaura or *vice versâ*. Dhaura is chiefly found on low-lying clayey soils at the foot of the hills or in flat depressions on low ridges, &c., or on low moderate slopes with a southerly aspect, and manages to live on very badly-drained ground.

It is most abundant in Sattikhala 2, 3 ; Malan 1 ; Sigadi 20 ; Luni 2, 3 ; Kauria chaur, where there are nearly 30,000 trees, and Kunau 1, 3, 4, 5, and 7. The total contents of the forests are estimated to be :—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	25,620	7,577	918	2,881	657	759	563	38,975
Gori ditto ...	94,110	11,046	2,543	3,146	1,022	837	518	113,222
Udepur inaccessible ...	13,238	3,584	379	870	211	433	176	18,891
Gori ditto ...	2,246	124	34	...	12	...	...	2,416
Total ...	135,214	22,331	3,874	6,897	1,902	2,029	1,257	173,504

From these figures it will be observed that dhaura nearly always remains a small tree, the proportion of III. and IV. class trees to I. and II. class ones being as 13·3 to 1, whilst over one-third of the first class trees are unsound.

It is almost entirely absent from the Amgadi block.

52. *Gosam* (*Schleichera trijuga*).—This species is frequently met with on southerly or south-easterly aspects associated with bakli, although in no case is it as numerous as the latter, and it but seldom forms a tenth part of the whole stock save in parts of Gewai 1, Amgadi 3, Dogadda 1, 6, and Kunau 1, 4, 7.

The area containing gosam is as follows :—

	Acres.
Bakli, kokat and gosam ...	650
Bakli, kokat, sain and gosam	400
Kokat, bakli and gosam ...	1,038
Kokat and gosam ...	90
Total area containing gosam which never predominates ...	2,178

The figures of the valuation survey are summarized as follows :—

	IV. Class.	III. Class.		II. Class.		I. Class		Total.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	7,982	2,120	625	572	155	190	115	11,759
Gori ditto ...	37,351	10,733	4,409	2,609	1,824	1,160	1,249	59,335
Udepur inaccessible ...	3,500	790	425	188	58	82	...	5,043
Gori ditto ...	1,969	508	175	174	...	66	35	2,927
Total ...	50,802	14,151	5,634	3,543	2,037	1,498	1,399	79,064

The proportion between the young and the old trees is thus 8·3 to 1, and more than one-third of the latter are unsound.

The largest number of mature gosam will be found in Mundhal 4, Bedasni 1, 5, and Kunau 1, 4, 7.

53. *Shisham and khair* (*Dalbergia Sissoo and Acacia Catechu*).—Shísham often mixed with khair occurs on the alluvial soil recently deposited by the main streams, and thus, owing to their situation, these trees are constantly liable to be washed away by floods during the rainy season ; and this is the reason why we find them in patches at the bends of the rivers, each patch generally containing trees of about the same age. Khair is also found in small numbers on hilly ground, but does not reach such useful dimensions as on the alluvium. The following is an estimate of the area which they cover :—

	Acres.
Shísham and khair ...	805
Shísham, khair and kokat ...	679
Kokat, shísham and khair ...	611
Total ...	2,095

The peculiarities of these forests are graphically described by Mr. Brandis, as follows :—" These two species (shísham and khair) occur in the valleys high up into the hills, and large quantities of their seed, which ripens during the dry season, are washed down by the flood, and are deposited, as the waters subside, on freshly formed islands and banks, where the young plants spring up in large masses together. When the ground has remained undisturbed for some time, other species settle and give the forest a more mixed character, the most common of which are *Casearia tomentosa, Ulmus integrifolia* and *Moringa pteryosperma.* But these mountain streams shift constantly and change their course, cutting through the forest and throwing down thousands of trees. The result is a natural but irregular system of rotation and successive belts of khair and shísham, representing a gradation of ages, saplings, poles, and mature trees. The streams cut indiscriminately through the forest, rooting up saplings, poles or mature trees as they happen to be in the way. In exceptional cases only do the shísham and khair forests attain full size in such localities, but the great mass of these trees are young, and are constantly liable to be cut down by the erratic currents of the streams long before the trees attain maturity."

The contents are estimated as follows, the whole of the trees along the main streams having been counted: —

	IV. Class	III. Class.		II. Class.		I. Class.		Total.	
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.		
				SHÍSHAM.					
Sigadi 6, 12, 13, 14 ..	7,017	385	...	7	...	...	...	7,409	Udepur
Luni 4, 5, 6, 7, 11 ...	10,891	479	...	35	...	3	..	11,408	Gori.
Mundhal 11 ...	8,708	1,178	17	229	12	35	2	10,181	
Dogadda 5, 6 ..	20,476	3,340	149	579	65	107	27	24,743	
Total completely valued.	47,092	5,382	166	850	77	145	29	53,741	
Udepur accessible ...	201	37	...	...	...	...	...	238	
Gori ditto ...	2,285	549	24	210	...	24	...	3,092	
Grand Total ...	49,578	5,968	190	1,060	77	169	29	57,071	
				KHAIR.					
Sigadi 6, 12, 13, 14 ..	2,283	13	...	3	...	...	...	2,299	
Luni 4, 5, 6, 7, 11 ...	5,920	106	96	...	13	...	...	6,135	
Mundhal 11 ...	1,881	44	8	1	...	...	...	1,934	
Dogadda 5, 6 ...	4,596	109	5	2	3	...	...	4,715	
Total completely valued.	14,680	272	109	6	16	...	...	15,083	
Estimate of remainder.									
Udepur accessible ...	6,172	253	...	38	45	...	...	6,508	
Gori ditto ...	19,387	1,008	586	24	161	...	36	21,202	
Udepur inaccessible,	4,573	241	36	...	...	...	...	4,850	
Gori ditto ...	2,415	81	17	...	...	...	...	2,513	
GRAND TOTAL ...	47,227	1,855	748	68	222	...	36	50,156	

From these figures it will be seen that there are scarcely any mature shísham and khair, the proportion of young trees to old ones being for—

Shísham	41·7 to 1
Khair	122 to 1

and that these species are not often unsound except in the case of khair growing on hill-sides.

Only fallen or dead shisham trees have been allowed to be exported for many years past, as the forests had previously been overworked, which, as well as their peculiar situation, accounts for the present paucity of large trees. The khair timber is used for pestles for wooden sugar-miles (churan) and for a smaller kind of pestles (musal) used for hand-pounding grain, but by far the larger amount is exported as churans, the demand for which has certainly diminished since the introduction of iron sugar-mills. The wasteful process of cutting and digging up immature khair by the roots for musals was prohibited by the forest notice of 1884-85, and the manufacture of cutch is also forbidden.

54. *Jaman* (*Eugenia Jambolana*).—The finest trees are met with along the banks of the numerous streams, and the species is most abundant in the Udepur range, being mainly confined to damp places, although occasionally found on the hill-sides ; it

does not form a large proportion of the stock, and its numbers are estimated as follows:—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total
		Sound.	Unsound.	Sound	Unsound.	Sound.	Unsound.	
Udepur accessible .	6,106	3,248	508	977	279	417	335	11,783
Gori ditto	5,777	2,072	436	584	235	95	305	9,604
Udepur inaccessible ...	3,270	2,059	387	591	355	412	597	7,671
Gori ditto ...	1,190	814	113	255	50	51	27	2,500
Total	16,343	8,193	1,444	2,407	919	1,075	1,264	31,558

The proportion of young to mature trees is thus rather more than 4 to 1, and more than half of the 1st class trees are unsound.

55. *Sandan* (*Ougeinia dalbergeoides*).—All slopes with southerly aspects contain a notable proportion of sandan, but owing to the superficial nature of the soil, and to the precipitous and rocky character of the ground, the species generally remains stunted and is more like a shrub than a small tree, so that only a small proportion of the estimated number given below will ever yield serviceable timber. Sandan is also found, although in much smaller numbers on the more favourable slopes, and it is here that the best trees are met with.

The number of I. and II. class sandan is however quite insignificant compared with the last two classes, *viz.*, 1 to 20, as will be observed from the following list :—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	70,314	3,136	951	202	21	10	...	74,634
Gori ditto ...	168,355	10,724	6,870	306	601	28	43	186,927
Udepur inaccessible ...	44,638	2,316	545	237	93	...	..	47,829
Gori ditto .	26,780	1,188	876	...	77	...	7	28,937
Total ..	310,096	17,364	9,242	745	792	38	50	338,327

56. *Tendu* (*Diospyros melanoxylon and montana*).—Like the sandan, this never becomes a large tree. It is fond of warm southerly slopes and is common in such places on rather stiff binding soils. It is most abundant in the Sigadi, Rawasan and Luni blocks, very rare in the Gwalgarh, Malan, Laldhang, Amgadi, Ander Majhera, Dogadda and Bedasni blocks, whilst it is entirely absent in the Gewai, Sukrau, Sattikhala, Jogichaur, Kauriachaur and Kunau blocks.

	IV Class.	III. Class.		II. Class.		I. Class.		Total
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible	27,943	2,682	830	163	88	31	5	31,742
Gori ditto ...	11,438	785	554	107	74	6	51	3,015
Udepur inaccessible ...	1,976	188	60	...	...	...	15	2,239
Gori ditto ...	1,247	5	...	...	...	5	15	1,272
Total ...	32,604	3,660	1,444	270	162	42	86	38,268

57. *Chir (Pinus longifolia.)*—This tree is only found on the higher sandstone ridges in somewhat inaccessible localities, and nowhere do we see such fine well-grown trees with great length of bole as are common in the extensive chir forests farther in the interior of the Himálaya. It occurs mainly on the higher ridges in the Gwalgarh, Malan, Laldhang, Rawasan and Amgadi blocks.

Owing to its situation the figures here given, which are those of the valuation survey, are probably rather below than above the reality :—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total.
		Sound.	Unsound	Sound.	Unsound.	Sound.	Unsound	
Udepur accessible ...	114	114	...	92	...	...	...	320
Gori ditto ...	...	...	...	...	...	...	...	.
U'depur inaccessible ...	1,309	1,140	21	667	...	1,005	46	4,188
Gori ditto ...	40	94	...	54	...	14	...	202
Total ...	1,463	1,348	21	813	...	1,019	46	4,710

58. *Kokat—all species other than the ones just mentioned.*—The number of kokat far exceeds that of all the other species combined, the contents of the circle being estimated as follows:—

	IV. Class.	III. Class.		II. Class.		I. Class.		Total.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
Udepur accessible ...	586,639	112,168	20,718	20,587	7,751	9,577	6,087	763,527
Gori ditto ...	1,069,685	151,540	33,397	23,706	9,787	10,251	8,332	1,306,698
Udepur inaccessible,	236,459	27,980	4,532	3,876	899	1,548	672	275,966
Gori ditto ...	117,172	11,624	1,538	1,157	349	186	159	132,185
Total ...	2,009,955	303,312	60,185	49,326	18,786	21,562	15,250	2,478,376

The proportion of small to large trees is thus over 20 to 1.

With the exception of certain small areas covered with shisham and khair the stock always contains a notable proportion of kokat which predominates over nearly two-thirds of the area valued, whilst some low-lying compartments, such as Sigadi 3, 4, 13, 14 and 15, Luni 5 and 6 (except the raised sál plateau), Kauria chaur 1, and Kunau 2, are stocked almost exclusively with kokat.

The number of species included under this name is very numerous, as will be seen by referring to the list at the beginning of the chapter, which is by no means an exhaustive one. Some of them, such as semal, bahera, ban, amaltas, saojna, doldhak, dhak and kaim, are capable of attaining very large dimensions, whilst others, such as aonla, pula, ber, riuni, chila and dudhi, generally remain small trees, and others again are mere shrubs.

The most valuable species amongst the kokat are bahera, semal. bel, padal and kaim.

Bahera is common on low ground in scattered kokat forest at the foot of the hills, where it becomes a large tree with a long straight bole. Semal grows to a large size, developing big buttresses, on the banks of the Ganges in scattered kokat forest and in grass lands, its wood being used on the river as floats for the heavier kinds. Bel is common in places, especially on low level ground with other kokat in Rawasan 7, Luni 5, Kunau 6 and 7, and on the flat in Andermajhera 1, where there are some exceptionally fine trees. Padal occurs scattered throughout the working circle, whilst kaim is principally met with, associated with haldu. The Canal Department has found the wood of pial, jhingan, pula and kura to be so inferior that they now refuse to accept them for use in the canal head-works.

Kat-bhilawa is very abundant, associated with sál, on hilly stony ground, and aided by bhilawa, it probably serves as a useful nurse to the more valuable species. Like sál, kat-bhilawa is remarkably gregarious, and where the two occur together in equal proportions it may be safely concluded that the sál will never reach large dimensions owing to the poverty of the soil.

59. *Bamboo* (*Dendrocalamus strictus*).—Nearly half the revenue of the Ganges Division is derived from the sale of bamboos, the average annual amount realized during the past five years being Rs. 32,984. We shall have therefore to treat the various difficult questions connected with the reproduction and export of this extremely valuable produce somewhat in detail. Bamboos are very abundant throughout the Working Circle; but are not found on the higher ridges, as in those of the Bedasni block, their upper limit being probably about 3,500 feet.

They are also almost absent on the slopes facing the Ghasiram-ka-sot in the Mundhal block, and are very few and poor in Luni 11. As a rule, they occur in the greatest abundance along the foot of the hills and in hollows, and at the bottom of slopes in the hills themselves. In the Malan block they attain to a remarkable size just below the main ridge. They are very abundant and of good quality in Mundhal 8, and on the plateau which lies partly in Luni 2 and partly in Rawasan 7. The Andermajhera block was closed against fire, mainly on account of the very large number of first class bamboos which it contains.

On the flat ground along the base of the hills the clumps are usually scattered and the clumps are small, and they are also of very inferior quality on the chaors of the Kunap block. Wild elephants are very destructive, eating, breaking or uprooting them in large numbers, especially on the level ground, chaors and plateaux.

The bamboos have also been overcut in all the most accessible localities, and serious damage by fire has been observed in some places, *e. g.*, west of the Daulawala sot in Luni 8.

60. For the Garhwál forest Dr. J. L. Stewart gives the following trade classification of cut bamboos, beginning with the least valuable :—

1. *Chaneju*, long and thin, used for roofing purposes.
2. *Lathi*, thicker, shorter, sold for walking sticks and clubs.
3. *Bahi*, similar but thicker, for sides of cots.
4. *Kanderu*, between the last two in thickness, but chiefly used for roofing purposes.
5. *Saraincha*, much thicker, shorter, hollow, also used for roofing purposes.
6. *Dashatta*, similar but much longer.
7. *Bhangi*, thickest of all and less hollow, used for tent and dooly poles.

61. This bamboo grows from 30 to 50 feet high in Garhwál and the stems attain their full height in a few weeks at the commencement of the rains ; in the Panjáb they do not harden fully during the first year, and this appears to be the case also in these forests.

62. It occasionally flowers gregariously, but generally single stems only or single clumps are found in flower. Mr. Greig writes as follows on this point in January, 1879 :— " We have a wonderful crop of bamboos this year. I have been observing our bamboos a good deal lately, and I have observed numbers with one or two stems of a clump in flower ; in some places as many as 5 per cent. of the clumps have flowering stems, and in others I have only found ten clumps with flowering stems out of several thousands examined. Between Kotdwara and Haldukhata whole clumps over large areas have seeded and died, and the ground is now a dense thicket of young clumps of from 10 to 30 feet high. The seeding commenced here in 1869 or 1870, and has been going on ever since. Many of the few remaining old clumps

are now seeding, not one or two stems, but *every stem of the clump*, and not one single instance did I see in that forest of only one or two stems in seed. These remarks apply to the forests below Gorighát and along the *base of the hills* between the Ganges and Rámganga rivers."

63. In order to test the productive power of bamboos under various degrees of thinning, 16 clumps were thinned in different ways in the Rámpur block in the Saháranpur Division in 1880, and in the year following this number being considered too small to give satisfactory results, 30 fresh clumps were selected, and in 10 of these all the stems were cut down ; in 10 others six good stems were left, while in the remaining clumps only half the stems were taken. Clumps in the Dehra Dún forests were also fenced in with a view to a similar experiment. The experimental treatment of clumps in the Ranipur block had to be abandoned last year as all the clumps seeded and died.

64. The Inspector-General of Forests inspected the forests of the Garhwál and Ganges Division in 1883, and the following remarks on the bamboo trade are taken from the memorandum he wrote on that occasion :—

"The number of bamboos removed from the Garhwál and Ganges Division during the last ten years for which the accounts are available and the revenue realized were as follows :—

Year.	Bamboos exported.	
	No. in round millions.	Revenue realized in rupees.
1873-74	20	64,000
1874-75	18	53,000
1875-76	21	68,000
1876-77	17	55,000
1877-78	14	47,000
Average of first five years	18	57,000
1878-79	6	22,000
1879-80	14	45,000
1880-81	15	51,000
1881-22	19	64,000
1882-83	17	59,000
Average of 2nd five years	14	48,000

"These data show that the export of bamboos has fallen off during the last ten years and that the revenue has been reduced accordingly.*

"It should, however, not be overlooked that the year 1878-79 was evidently abnormal ; but even allowing for this, there is still an average decrease of about 2 millions per annum visible during the last five years. Although the falling off is not as yet very decided, the subject is of sufficient importance to necessitate some further investigation.

"At pages 89 and 90 of his report of 1882, on the Garhwál forests, Mr. Brandis has stated that the bamboos have been much over-cut, and that in consequence the young shoots produced are short and thin ; in fact, that the stock of bamboos has considerably deteriorated since he first visited these forests in 1864.

"The Consevator of Forests, on the other hand, maintains that the bamboos in Garhwál have not been over-cut, and that they have not deteriorated since he has known these forests. I have seen these forests now for the first time, and I am not in a position to say whether the bamboos have deteriorated ; but I can testify to the fact that the clumps have generally not been cut in an economical manner. It is well known that, in order to produce strong young shoots, it is necessary to leave a few shoots every year, but this, as a rule, is not done at present.

* Mr. Bagshawe, the present Conservator, considers this falling off to be due in a great measure to the enormous reduction in the area occupied by mature bamboos caused by the extensive seeding during the past ten years, and that three or four more years must elapse before the large areas which seeded in 1879 will be fit to work.

"The bamboo cutters generally cut down every shoot in the clump, and after they have completed their operations, the clump consists merely of a number of stumps, and the shoots produced by them are, as a rule, very inferior. In this respect a more efficient control is urgently required, if the supply of bamboos to the people and the revenue derived from this source are to be maintained. Such a control can only be effectually established by keeping count of the men who cut in the several areas. The Conservator of Forests is about to take up the subject by inserting a condition in the annual notices that bamboo clumps may only be cut in a certain manner, and by enjoining a stricter supervision by the subordinate staff.

"I doubt, however, whether these measures will have much effect, unless a system similar to that indicated in paragraph 2* is introduced at an early date. If by means of such a system an efficient control can be established over the manner of cutting the clumps, it is likely to lead to more satisfactory results than the working of the areas by rotation. Should the first system fail, then it may be necessary to keep always from one-half to two-thirds of the bamboo areas closed, so as to give the clumps the necessary rest."

65. In consequence of these remarks, orders having force from the 1st November, 1884, were issued by the Conservator holding all officers in charge of ranges and beats responsible that not less than four uninjured growing stems were left in every clump, and at the same time a new schedule of royalty rates was issued with the two-fold object of (i) simplifying the levying of dues, (ii) inducing exporters to remove only the best shoots, and not to cut the small and immature ones.

In the annual report for 1884-85 Mr. Greig reports as follows on these new arrangements :—

"(*a*)—The order to leave not less than four uninjured growing stems in every clump.

"After so many years of unrestricted cutting it could not, of course, be expected that, over the enormous area of our bamboo forests, and amongst the several thousands of semi-civilized men who cut the bamboos, the new order should be rigidly attended to during the first year of its working. Several cases of breach of the new rule were detected and reported by the subordinates, but so earnestly did the divisional officers insist on the order being enforced, that one had to scramble up into the remote parts of the forests and search carefully to find here and there a clump of less then five stems out of which a stem had been cut during the season. I was very much pleased with the improved condition of the bamboo forests, and the divisional officers agree with me in thinking that in another year or two the new order will be thoroughly established, and that it will have the desired effect of preventing the clumps being over-cut.

"The only other way to keep up a supply of bamboos is to close portions of the forest for fixed periods, but as a certain proportion of what are exported from the forest *are shoots of the year*, I think that, for this and several other reasons, the system which we have adopted is far preferable.

"The receipts from the Ganges Division during the last five years are—

	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.
Rs.	27,442	36,643	35,572	36,862	28,399
† Number of bamboos exported, in thousands ...	7,401	10,914	9,585	9,429	7,483

* In paragraph 2 the abolition of the kham tahsil system is advocated, substituting for it a system which would insure a more effective control over the operations inside the forest.

† The numbers have been shown from divisional returns.

"The decrease of last year would have been larger but for the opening of a large block (the Ander-majhera block) of forest which had been closed to bamboo cutting for the two previous years. In 1885-86 there will perhaps be a further falling off in the revenue; but after that I think it will rise rapidly, and will soon come up to, and probably exceed, the average of former years.

"(*b*)—The new schedule of rates of royalty on bamboos which came into force on 1st November, 1884.

"Formerly the royalty on bamboos was levied on trade names, the principal of which were—

Chaneju at Rs. 6 per 100 score.
Kanderu " " 9 "
Saraincha " " 12 "

"There were no distinct specifications of the length and thickness of these bamboos, but it was an understood thing that a 'chaneju' was any bamboo which had its branches hacked off by a single blow of the axe from above the shoot, and was otherwise carelessly prepared, whereas the branches of 'kanderu,' 'saraincha,' &c., were carefully pared off by upward cuts, so as not to split the bark or injure the stem.

"A very large proportion of the bamboos exported were 'chaneju.' For instance, out of 375,432 scores exported from the Garhwál Division in 1883-84, 237,633 scores were 'chaneju.' So long as the supply exceeded the demand (as it formerly did), there was no object in risking a check on trade by being very particular about specifying the length and thickness of the different classes, or by checking the wasteful process of making 'chaneju,' at Rs. 6 per hundred score, of bamboos which were fit for 'kanderu' and 'saraincha' at Rs. 9 and Rs. 12 per hundred score.

"The demand for bamboos is very much the same as it always has been, but the number of wild elephants has increased enormously of late; and it was about three years ago that I first observed a likelihood of a strain upon our bamboo resources. After a searching enquiry into all the conditions of the trade, it became quite evident that, after providing for reproduction (which has been done by the order to leave not less than four uninjured growing stems in every clump), the most important point was to place a heavy check on the cutting of 'chaneju.' In 1883-84 we attempted this by the establishment of length and girth specifications for all classes of bamboos, but this was an utter failure and was very soon abolished.

66. "A list of the new rates is given below.

"They have been in force during the whole of the working season and have worked admirably. Although they have had the effect of increasing the rate per score from 14·3 pies in 1883-84 to 15·73 pies in 1884-85, the royalty has not really been increased at all, the increased average being due to the immature stems not being cut and inferior kinds like 'chaneju' not manufactured, and only the better kinds exported, which is the very object we aimed at.

"Specifications adopted for each class of bamboo:—

From 1st November, 1884.

Dimensions.	Royalty per 100 score.			
	Rs.	a.	p.	
4 feet long any girth	4	0	0	
10 " "	9	0	0	
12 " "	12	0	0	
15 " "	15	0	0	
20 " "	0	0	6	each.
any length	0	1	0	each.

"A 'chaneju' was from 8 to 10 feet in length, and by the new rates there is no inducement to cut them.

"This classification was subsequently modified, and the following schedule shows the rules now in force:—

Number of class.	Vernacular name and special description where necessary.	Maximum length.	Rate per bamboo or per 100 score.		Rules.
			By land.	By water.	
1	...	Above 20 feet	1 anna each	1 ¼ annas each	In measuring the length of any bamboo, 3 inches is the maximum excess which may be allowed.
2	...	20 feet	6 pies each	ditto	
3	...	15 „	Rs. 15 per 100 score.	Rs. 17 per 100 score.	
4	...	12 „	„ 12 ditto.	„ 14 ditto.	
5	...	10 „	„ 9 ditto.	„ 11 ditto.	
6	...	4 „	„ 4 ditto.	„ 6 ditto.	The classification is based on the length of the bamboo in all cases except Nos. 7 and 8, being solid.
7	Láthi and "Bahi" (solid or nearly so).	6 „	„ 9 ditto.	„ 11 ditto.	
8	Ditto ...	12 „	„ 12 ditto.	„ 14 ditto.	

"The number of láthis and bahis exported from the Ganges Division during 1884-85 was, in thousands, 1,717, or nearly one-fourth of the entire number of bamboos exported."

67. As the habits and requirements of this species are not very well known, it may be useful to give here some extracts from an excellent note on the *Dendrocalamus strictus* of the Central Provinces by Colonel Doveton, which appeared in the "Indian Forester" of November, 1883, in so far as his remarks are applicable in the present case.

Distribution.—Widely as this species is distributed, it is not to be found in all localities, nor on all soils. The slopes of hills, ravines, and the banks of nálas are the favorite localities. In the plains it occurs, forming dense masses and covering large areas, but on sandy soils only.

A rich and free soil, good drainage and plenty of moisture are favorable, if not essential, to its production; though, as already stated, it is found forming dense masses in the sandy plains; in such places it only flourishes on the banks of nálas or where there is a good deposit of vegetable mould.

On a considerable area of poor sandy soil it abounds without attaining any size, and in such cases its existence can only be attributed to conditions being favorable to germination, and to the protection to the young plants afforded by tree vegetation.

The species thrives best when associated with tree vegetation. It is more or less shade-bearing, according to age, as a young seedling. Except under artificial cultivation, it will not, without shade live through a single hot season, while even with mature clumps, light tree shade appears favorable to the plant, and under the latter condition the yield of individual clumps is greater and finer than the pure bamboo forest.

68. *Seeding.*—In every forest producing this species a certain number of stems flower and seed annually, but a general seeding is only an occasional occurrence. According to our present knowledge the conditions conducive to the production of seed may be thus briefly stated:—

1st, a short rainfall; 2nd, a poor unfavorable soil; 3rd, the condition of pure bamboo forest and absence of the shelter of tree vegetation; 4th, greater or less rest from cutting.

The second condition is closely allied to the first, for the bamboo is a surface feeder, and in forests not protected from fire, its impoverishing effect on soil is very great. It will be observed that all four conditions tend to one end, *viz.*, to check the production of new shoots, which must therefore be considered the primary cause of general seedings. Probably the real cause of seeding is exhaustion of the soil accessi-

ble to the roots of the clumps, which is felt the more the dryer the season : a supposition further supported by the fact that seeding is more common on poor than on rich soils.

Stems that flower casually yield hardly any fertile seed and hardly any seed at all, whereas in the general seedings the yield is very large and all seeds are of excellent quality, especially in the first year.

69. *Reproduction.*—Artificial reproduction is secured by seed, and by rhizomes with rootlets and portions of the stems attached. In the early stage of existence the rhizomes are larger in proportion to the stems and have greater vital powers. Natural reproduction is, to a greater or less extent, ever going on wherever the species exists, and the result of a general seeding, notwithstanding that vast quantities of the seed must be destroyed, chiefly by rats and birds and in unprotected forests by fire, is a dense mass of young plants which spring up after the first few showers of rain. In the first stage of their existence the young plants are very delicate, and except under the influence of plenty of moisture, are unable to resist the scorching effect of the uninterrupted sun's rays; they have moreover to compete with the minor grasses, by which the seedlings are easily and speedily choked and destroyed, nor can they withstand an excess of water about their roots, which causes them to turn yellow and die off rapidly.

Thus it is that, with rare exceptions, those seedlings only which are more or less under forest cover, live through the first hot weather or even the first monsoon.

70. *After-growth.*—The plants even when established have many enemies; the young rhizomes are readily eaten by rats, pigs and bears, and the young succulent shoots as they appear above ground are nipped off and eaten by deer and pig.

A plant once established, if undisturbed, goes on increasing the number of its shoots, until the time of flowering, notwithstanding that some die and decay ; and the size of the shoots continues steadily to increase till what may be considered full-sized shoots for the particular soil and locality are produced. The number of years necessary for the production of full-sized shoots is undetermined, but is known to vary greatly according to the conditions under which the plants have grown up.

In natural forests there is reason to believe that full-sized shoots are not produced until the clumps are about 12 years old, but in really successful, artificial plantations the time will probably be reduced to six years. Thinning of the clumps does not stop the production of shoots, and if judiciously executed appears to favor it. Complete cutting over of the clumps, even when of large size, throws back the after-growth, resulting, in the first instance, in the production of small shoots from the joints of the rhizomes 3 to 6 feet in length, and the gradual process of the shoots increasing in size year by year till the full size is obtained, has then again to be gone through. The effect of such cutting over is however less in proportion as the number of stem joints left is greater.

Each rhizome is provided with one or more eyes from which new shoots are produced. In young plants and clumps new shoots are produced from the last formed rhizomes, which accounts to some extent for the annual progression in the size of the stems. This system of production by progression from the last formed rhizomes does not, however, long continue, and ceases altogether after shoots of full size have been produced ; after this stage has been attained, new shoots appear most commonly to start from two-year-old rhizomes.

Whether shoots are ever produced from rhizomes that have been completely deprived of all portions of their stems has not been finally determined, but to the entire loss of stems is at present attributed the death of many clumps cut back on boundary lines.

The production of new shoots by young clumps is confined to no fixed season of the year, but goes on rapidly under the influence of moisture. This condition gra-

dually changes as the plants grow older, till when full-sized shoots are produced; production is confined to a fixed period, usually between the 20th August and the 20th September.

71. *Yield.*—Owing to the want of a proper system of working, the possible yield of bamboo forest is as yet undetermined. In some cases production is diminished by the denseness of the crop and the impossibility of all shoots that start forcing their way through the mass of stems that stand above them; in other cases by the removal of stems that should have been left standing, while many shoots are destroyed by elephants and other animals.

It may, however, be said that 150 large clumps per acre form dense bamboo forest, and that when there is a full crop of bamboos on the ground the yield per acre does not ordinarily exceed 300 stems.

72. *Treatment.*—In the treatment of this species there are three objects to be kept in view :—

First.—To secure the largest possible yield.

Second.—To defer, or, if possible, prevent gregarious seeding.

Third.—To secure the reproduction of the species in case of a general seeding.

73. *Association of tree vegetation.*—It has already been indicated that D. *strictus* thrives best when associated with trees, and that under other conditions the establishment of a new crop after a general seeding is not likely to result. It is therefore evident that the preservation of a certain amount of tree vegetation is desirable and probably necessary. The trees preserved should, however, be of the lofty varieties, which will not interfere with the spread of the crowns of the bamboo clumps. The number of trees it is desirable to preserve must depend on a variety of conditions; but it is recommended that the leaf canopy resulting from the tree vegetation should not exceed one-half and not be less than one-quarter of the total area, *i.e.*, assuming the production of bamboos to be the primary object, the lighter the foliage, the more trees may be returned to the acre.

74. *Thinning of clumps.*—As regards cutting or thinning, it is obviously essential to preserve in a vigorous condition those eyes whose turn it is next to produce shoots; it has already been indicated that after clumps have produced full-sized shoots reproduction is generally from rhizomes of two years old, though occasionally from those of greater age. It is therefore obvious that to secure a maximum production no shoot should be cut until the end of the monsoon succeeding that in which it was itself produced, unless increased production is rendering the forest too dense, a condition which cannot be said to exist as long as there is ample space for the upward course of new shoots. That the removal of all other stems will render more certain the production of shoots from the rhizomes of older stems left, may fairly be assumed from the fact that it will diminish the drain on the food-supply available for the nourishment of new shoots, and that it will leave more space for the development of foliage on the standing stems.

Thus, with the exception above noted, the preservation of all stems till the end of the second rains succeeding their development is calculated at least to maintain the production of shoots. When to meet special demands for what are known in the market as green bamboos it becomes necessary to cut young stems, the cutting should not be flush with the ground but two feet above, thus leaving eyes for the development of branches and foliage to preserve the vigour of the root, and the cutting should be confined to a small proportion of the young shoots in each clump. Where, however, the crop is tolerably full, and the annual production of shoots is on the increase, a limited number of young shoots may be cut down to the ground without fear.

75. When the conditions indicated can be secured, the working of the whole area and every clump annually will be advantageous; but where this cannot be done,

the working of the forests in blocks on a three years' rotation will probably secure the closest approximation to what is desired.

76. *Grass and other minor produce.*—Compared with that derived from bamboos, the revenue from this source is unimportant, only amounting to Rs. 2,440 annually, taking the average of the past five years.

Appendix B enumerates all the various kinds of produce, over 100 in number, on which royalty at various rates is charged.

In 1884-85 the revenue realized was as follows :—

		Rs.
Skins	6,513 in No.	971
Horns	1,130 „	27
Kanda	1,109 mds.	348
Kapur Kachri	125½ „	52
Bark of Lod	147 „	61
Hirr	60 „	80
Pula grass	1,534 „	38
Ropes (Bán)	98 „	20
Mirchiyakand	30½ „	8
Gum	9 „	3
Amaltas	...	4
Wax	1 md.	6
Honey	4 mds.	61
Stones	...	68
Miscellaneous	...	1,038
	Total ...	2,785

77. To write an account of all the different kinds of minor produce exported directly from the forests or brought through them usually *viâ* Kotdwar from the upper hills would require a volume in itself, and an interesting chapter on the subject will be found in the Gazetteer, North-Western Provinces and Oudh. Here only a short list can be given, with the hope of drawing attention to the subject, about which there is much to be learnt. This list shows the edible fruits, &c., and the principal products exported for use as medicine, dyes and tans, gums, resins and fibres.

Owing to the number of edible wild fruits these forests are valuable to the starving people in times of famine, and owing to the number of trees yielding fodder, give substantial support to cattle in time of drought.

From the list it will be observed what a large number of plants are said to possess medicinal properties by the natives, imaginary of course in some cases.

The local market for either tans or dyes is inconsiderable, and the plains markets are now filled with the products of the latest discoveries in Europe, which in cheapness and quality far surpass the hill materials, and are now ousting the local dyes from general use. A demand for bark for tanning purposes will, however, always exist, as it would not be profitable to import it. Very little gum is exported from the Ganges Division compared with the Kumaun and Garhwál Divisions, where the export amounts to nearly 500 maunds.

There is an immense quantity of material in the forests for ropes, cordage, twine, basket-making and matting. The Bábar grass (mainly the produce of *Spodiopogon angustifolius* but in part of *Eriophorum comosum*) is sufficient alone to supply all India with a valuable material for making coarse cordage and paper. This branch of industry should have a great future in store for it.

Lac occurs on the pipal (*Ficus religiosa*), bargat (*Ficus bengalensis*), ber (*Zizyphus Jujuba*), dhák (*Butea frondosa*), dholdhák (*Erythrina suberosa*), gosam (*Schleichera trijuga*), and other trees.

Lime has not been exported for several years, as limestone is not plentiful in any of the raus, whilst it is rarely found *in situ*, as will be seen from the chapter devoted to the geology of the district.

Order.	Scientific name.	Vernacular name.	Portions edible.	Parts used in medicine.	Dyes and tans.	Gums and resin.	Fibres.
Berberideæ ...	Berberis aristata	Chotra ...	...	...	...	...	
Ditto ...	" Lycium	...	...	Root ...	Root and bark (*d*) ...	...	
Fumariaceæ ...	Fumaria parviflora	Khairuwa ...	...	Herb ...	...	...	
Bixineæ ...	Flacourtia Ramontchi ...	Kandai ...	Fruit ...	...	...	...	
Ditto ...	" sepiaria	...	...	Leaves, bark and root,	...	...	
Ternstroemiaceæ ...	Saurauja nepalensis ...	Gogana ...	" ...	...	...	...	
Dipterocarpeæ ...	Shorea robusta	Sál ...	...	...	...	Resin (ral) ...	
Malvaceæ ...	Malva sylvestris	Tilchoni ...	...	Herb ...	...	...	
Ditto ...	Kydia calycina	Pula Pata ...	...	Bark ...	...	...	Bark.
Ditto ...	Bombax malabaricum ...	Simal ...	Calyx of flower buds ...	Leaves, root and gum,	...	Mochars (*g*) ...	Cotton from pods.
Sterculiaceæ ...	Sterculia villosa	Udyal ...	...	...	...	Katira (*g*) ...	Bark.
Ditto ...	" urens	Katira ...	Roasted seeds ...	...	...	...	
Ditto ...	Helicteres Isora	Maror phal ...	...	Seeds ...	...	...	
Tiliaceæ ...	Grewia oppositifolia, &c. ...	Behla Bhimal ...	Fruit	...	...	...	Bark.
Ditto ...	" asiatica	Pharsiya ...	...	Leaves and fruit ...	...	...	
Malphigiaceæ ...	Hiptage Madablota ...	Aita lugula ...	...	Leaves ...	...	...	
Geraniaceæ ...	Oxalis corniculata	Chalmori ...	Leaves ...	Leaves, stalks ...	...	...	
Rutaceæ ...	Glycosmis pentaphylla ..	Potta ...	Fruit	...	...	...	Bark.
Ditto ...	Murraya Koenigii	Gani ...	...	Seeds and roots ...	...	...	
Ditto ...	Ægle Marmelos	Bel ...	" ...	Fruit ...	Fruit (*d*) ...	Kind of gum arabic.	
Burseraceæ ...	Boswellia serrata	Salai ...	...	Gum ...	...	Gum.	
Ditto ...	Garuga pinnata	Kharpat ...	Drupe ...	...	Bark (*e*) ...	...	
Maliaceæ ...	Melia Azadirach	Bokain ...	...	Seeds, roots ...	...	...	
Ditto ...	" Azadirachta	Nim ...	...	Leaves, seeds, bark ...	...	...	
Ditto ...	Cedrela Toona	Tún ...	...	Bark ...	Flowers (*d*) ...	...	
Rhamnaceæ ...	Zizyphus Jujuba	Ber ...	...	...	Bark (*t*) ...	...	
Ditto ...	" sp.	...	Fruit ...	...	...	...	
Sapindaceæ ...	Sapindus Mukorossi ...	Rihta ...	...	Nut ...	...	...	
Anacardiaceæ ...	Pistacia integerrima ...	Kakar-singi ...	Nut ...	...	...	...	
Ditto ...	Odina Wodier	Jhingan ...	...	Leaves, bark, gum ...	...	Gond and kanne.	
Ditto ...	Semecarpus Anacardium ...	Bhilawa ...	Receptacle of fruit ...	Juice of nut ...	Nut ...	Varnish.	
Ditto ...	Mangifera indica	Am ...	Fruit ...	...	...	...	
Ditto ...	Buchanaria latifolia ...	Kat-bhilawa ...	...	Kernels of fruit ...	Bark (*t*) ...	Chironji-ki-gond.	
Ditto ...	Spondias Mangifera ...	Amra ...	...	Bark ...	...	...	
Moringeæ ...	Moringa pterygosperma ...	Soanjna ...	Bark, leaves, flowers, pods.	Roots, gum, oil ...	...	Mocharas.	
Leguminosæ ...	Ougeinia dalbergioides ...	Sandan ...	...	...	...	Gum-kino.	
Ditto ...	Abrus precatorius	Gunchi rakti ...	...	Seeds, roots ...	...	...	
Ditto ...	Butea frondosa	Dhak ...	...	Seeds ...	Flowers (*d*) bark ...	Kamarkas (a gum-kino),	Bark.
Ditto ...	Pueraria tuberosa	Billi-kand ...	Tubers ...	Tubers ...	...		
Ditto ...	Dalbergia Sissoo	Shísham ...	...	Leaves, sawdust ...	...		
Ditto ...	Cassia Fistula	Amaltás ...	Young pods ...	Leaves, bark, root, flowers, pulp around seeds.	Bark (*t*) ...		

Order.	Scientific name.	Vernacular name.	Portions edible.	Parts used in medicine.	Dyes and tans.	Gum and resins.	Fibres.
Leguminosæ ...	Bauhinia variegata ...	Khairwal ...	Flowers, buds, leaves ...	Flowers, bark, root ...	...	Sem-ki-gond.	
Ditto ...	" purpurea ...	" ...	...	...	Bark (*b*) ...	...	
Ditto ...	" retusa ...	Kandla ...	...	...	...	Semla ...	
Ditto ...	" racemosa ...	Kachnal ...	Seeds ...	...	...	...	
Ditto ...	" Vahlii ...	Maljan ...	...	...	...	...	
Ditto ...	Mimosa rubicaulis ...	Agla ...	...	Leaves, seeds ...	...	...	
Ditto ...	" pudica ...	Lajwanti ...	...	...	...	...	
Ditto ...	Acacia catechu ...	Khair ...	...	Cutch ...	Cutch (*d*) ...	Kind of gum arabic (sold as babul ki gond).	
Ditto ...	" lenticularis ...	Khain ...	...	...	...	...	
Ditto ...	Albizzia Lebbek ...	Kala Siris ...	...	Bark, root ...	...	...	
Ditto ...	" procera ...	Sufed " ...	...	...	...	...	
Ditto ...	" odoratissima ...	Siris ...	...	...	...	...	
Saxifragaceæ ...	Saxifra-galigulata ...	Silphora ...	...	Roots ...	...	...	
Combretaceæ ...	Terminalia belerica ...	Bahera ...	Kernels of nuts ...	...	Nuts, galls (*d*) nuts (*t*),	...	
Ditto ...	" chebula ...	Har ...	...	Nut ...	...	...	
Ditto ...	" tomentosa ...	Sain ...	...	...	Bark (*t*) ...	...	
Ditto ...	Anogeissus latifolia ...	Dhaura, Bakli ...	...	...	Leaves (*t*) ...	Hard white gum.	
Myrtaceæ ...	Engenia Jambolana ...	Jaman ...	Fruit ...	Leaves, bark ...	...	...	
Ditto ...	Careya arborea ...	Kumbhi ...	...	Flowers ...	...	...	
Lythraceæ ...	Woodfordia floribunda ...	Dhai ...	...	" ...	Flowers (*d*) ...	Kind of tragecanth.	
Ditto ...	Lagerstroemia parviflora ...	Bakli, Dhaura ...	...	...	Bark, leaves (*t*) ...	...	
Ditto ...	Punica Granatum ...	Anár ...	...	...	...	...	
Datiscaceæ ...	Datisca cannabina ...	Bhang-jula ...	...	Roots ...	Roots (*d*) ...	...	
Umbelliferæ ...	Cariandrum sativum ...	Dhaniya ...	...	Fruit-oil ...	...	...	
Ditto ...	Cuminum cyminum ...	Jora ...	...	...	...	...	
Rubiaceæ ...	Hymenodictyon excelsum ...	Bhalena ...	...	Bark ...	...	...	
Ditto ...	Randia dumetorum ...	Mainphal ...	Fruit ...	Fruit ...	...	...	
Ditto ...	Rubia cordifolia ...	Majethi ...	...	Roots ...	Roots (*d*) ...	...	
Valerianeæ ...	Nardostachys Jatamansi ...	Bálchhar ...	...	...	...	...	
Compositæ ...	Vernonia anthelmintica ...	Kalajira ...	...	Seeds ...	...	...	
Ditto ...	Eclipta erecta ...	Moch-kand ...	...	Fresh plant, juice ...	...	...	
Ebenaceæ ...	Diospyros melanoxylon ...	Tendu ...	...	Bark ...	...	...	
Styraceæ ...	Symplocos cratægoides ...	Lodh ...	...	...	Leaves, bark (*d*) ...	...	
Jasmineæ ...	Nyctanthes arbor-tristis ...	Parijat, harsinghar ...	...	Bark ...	Flowers (*d*) ...	...	
Apocynaceæ ...	Holarrhena antidy-senterica ...	Kuer, Dhudi ...	...	" ...	...	...	
Ditto ...	Alstonia scholaris ...	...	...	Bark, juice ...	...	...	
Ditto ...	Ichnocarpus frutescens ...	Dhudi ...	...	Leaves, roots ...	...	...	
Asclepiadeæ ...	Colotropis procera ...	A. K., Mudar ...	...	Juice, bark, roots ...	...	Elastic gum-resin ...	Bark.
Ditto ...	Marsdenia tenacissima ...	...	...	...	...	...	
Gentianaceæ ...	Gentiana Kurroo ...	Kura, Kutki ...	...	Herb ...	...	...	

Bignoniaceæ	Oroxylum Indicum	Pharkath, Ullu	Young pods (in Burmah.)	Leaves, seeds, bark	...	...	
Acanthaceæ	Adhatoda Vasica	Bashang	...	Leaves, flowers, roots (juice).	Leaves (*d*)	...	
Verbenaceæ	Gmelina arborea	Kumar	...	Roots	...	...	
Ditto	Vitex Negundo	Shiwali	...	Leaves, roots	...	...	
Labiatæ	Roylea elegans	Guma	...	Leaves	...	...	
Lauriness	Cinnamomum Tamala	Dalchini	...	Leaves, bark	...	...	
Euphorbiaceæ	Phyllanthus Emblica	Aonla	Fruit	Flowers, fruit (bark),	Fruit (*d*)	...	
Ditto	Mallotus philippinensis	Rauni	...	Powder on seeds	Powder or fruit (*d*)	...	
Moraceæ	Ficus indica	Bargat	...	Bark, juice	...	...	
Ditto	" religiosa	Pipal	...	" seeds, young shoots,	...	...	
Ditto	" hispida	Kagsha	...	" " fruit	...	...	
Ditto	" glomerata	Gular	Fruit	" root, juice	...	...	
Ditto	" Cunia	...	...	...	...	...	Bark.
Urticaceæ	Boehmeria macrophylla	Sochala goka	...	...	...	...	
Ditto	Debregeasia bicolor	Tushyari	...	...	...	...	
Piperaceæ	Piper silvaticum	Pippula múl	...	Fruit	...	...	
Cupuliferæ	Corylus Colurna	Kapasi	Nuts	...	...	...	
Ditto	Quercus incana	Bánj	Acorn	Acorn	...	...	
Myricaceæ	Myrica sapida	Kaiphal	...	Bark	Bark (*t*)	...	
Coniferæ	Pinus longifolia	Chír	...	...	...	Birja (resin)	...
Zingiberaceæ	Curcuma longa	Haldi	Roots	Roots, juice	Roots (*d*)	...	
Ditto	Hedychium spicatum	Kapur Kachri	...	Herb	Roots (*d*)	...	
Palmaceæ	Phoeni acaulis	Khajur	Short stem	...	...	...	
Liliaceæ	Lilium Wallichianum	Findora	...	Bulb-scales	...	...	
Ditto	Asparagus ascendens	Kharruna	...	Tubers	...	...	
Dioscoreaceæ	Dioscorea sp.	...	Roots	...	...	...	
Typhaceæ	Typha elephantina	Patera	...	...	...	...	
Ditto	" angustifolius	Bora	...	...	...	...	Leaves.
Gramineæ	Cynodon doctylon	Dúb	...	Leaves, roots	...	...	
Ditto	Dendrocalamus strictus	Báns	Tender sheots	Siliceous secretion, root.	...	...	
Ditto	Spodiopogon angustifolius	Bábar	...	Leaves, dried stems for (splinters).	...	...	
Ditto	Anatherium muricatum	Khas-khas	...	Roots	...	...	Herb.
Ditto	Saccharum Munja	Munj	...	...	...	...	Blades.
Ditso	" fuscum	Tát	...	Roots	...	...	Culms.
Cyperaceæ	Cyperus rotundus	Motha	...	...	...	...	
Ditto	" tegetum	Motha	...	...	...	...	
Ditto	Mariscus cyperinus	Nagar motha	...	...	Roots (*d*)	...	Culms.
Ditto	Eriophorum comosum	Babar	...	...	...	...	Herb.
Filices	Adiantum capillus-Venus	Mubaraka	...	Fronds	...	...	
Ditto	" Venustum	Hansraj	...	...	...	...	

CHAPTER VI.

CAUSES OF INJURY.

78. *Forest fires.*—The great season for these fires is between the 15th of February and the beginning of the rains; but in dry seasons some occur as early as January. With the exception of the protected blocks, only some damp, shady hollows and valleys covering an insignificant area escape being burnt yearly.

The general effect on vegetation is deplorable. The quality of the trees is much inferior to what it would be if fires were excluded. The trees are more crooked, have less length of bole; a larger percentage are hollow, their growth is much retarded, often by as much as ten or twenty years, and saplings are often burnt down to the ground, so that the greater portion of the stock really comes from coppice shoots, and they are rendered more liable to the attacks of insects, whilst a considerable quantity of dry standing or fallen trees are annually burnt entirely.

Reproduction is much checked and the quantity of seeds and seedlings destroyed must be very great. In the Mundhal, Bedasni and Kunau blocks the coefficient of reproduction is often less than 1, and for the open forest generally it varies as a rule between 0 and 5, whereas in the protected areas it often rises as high as 8, the sál seedlings being very numerous.

The density of the forest is also sensibly affected, and is much less than it probably would be if fires were excluded.

The formation of vegetable mould is almost entirely stopped and denudation is facilitated by the destruction of seedlings and undergrowth in general.

The spread of bamboos and grasses, such as bábar, has perhaps been encouraged rather than retarded by these fires, and this is probably the case with all plants possessing perennial rhizomes, which escape being burnt, as such plants have a greater chance of surviving than other species which have no underground stems. Bamboos once established, however, suffer from fires as well as trees, &c., and fire protection by improving the soil and preventing whole clumps being burnt down would, no doubt, tend to increase the size of the culms annually thrown up.

79. The following statement in tabular form shows the results of fire protection in these forests up to the end of 1885, since its commencement in 1875-76:—

Name of block.	Area attempted.	Failures.	Area protected.	Total cost.	Year when protection was commenced.
	Acres.	Acres.	Acres.	Rs.	
Papidanda (now Sigadi 13).	608	608	...	1,260	1875-76.
Jogichaur ...	788	371	417	2,576 (Including protection of Hazara, 2,000 acres.)	1880-81.
Kauriachaur ...	2,118	160	1,958		...
Andermajhera ...	1,410	44	1,366		..
Sukrau ...	1,132	136	996		1881-82.
Total ...	6,056	1,319	4,737	3,836	..

Owing to the recent survey the area shown in the old annual reports differs from that given above as follows:—

Name of block	Estimated area in annual reports.	Actual area.	Difference.
	Acres.	Acres.	Acres.
Papidanda	521	608	+87
Jogichaur	1,500	788	—712
Kauriachaur	3,000	2,118	—882
Andermajhera	1,500	1,410	—90
Sukrau	1,500	1,132	—368
Total ...	8,021	6,056	—1,965

The Papidanda block was closed in 1875 with a view to encouraging the growth of khair, a wood which was in great demand for sugar-mill pestles in those days. The experiment was not particularly successful, and the whole area was burnt in 1883-84. This and the fact that the demand for sugar pestles has considerably fallen off induced the Conservator last year to cease protecting it. A fire occurring in a block which has only been closed for two or three years is perhaps more dangerous than annually recurring ones in open forests, as the flames are fed by an accumulation of dead wood, grass, leaves, &c., and the effects of the fire in Jogichaur in 1883-84 may still be seen in the number of burnt young sál saplings, &c. ; most of these saplings have, however, coppiced, and with continuous fire-protection for a number of years the grass will be much reduced and protection rendered easier.

In those parts which have been continually protected for five or six years there is a marked improvement in the state of reproduction, especially in the case of sál ; shrubs are becoming more numerous, the ground better covered, and soil is being improved by the accumulation of humus, &c.

80. The length of the fire lines which have to be cleared and burnt annually is as follows :—

Name of block.	Number of miles of fire-line.	Number of acres protected for each mile of fire-line.
Jogichaur	6¼	126
Kauriachaur	8½	249
Andermajhera	10½	134
Sukrau	4¼	266
Total ...	29½	205

81. The following remarks regarding the fire-protection in the Ganges Division were made by Mr. Brandis in 1881 :—"Considering that there is a certain demand for wood of other kinds in the Gori range, it is of course important to extend fire-protection over a larger area, and the Conservator is of opinion that the whole area which faces the Ganges north of the Mundhal valley can gradually be brought under protection without causing either hardship or discontent. The Mundhal and Dogadda valleys would probably be left open as grazing grounds. Regarding the line which should be chosen as the eastern or inner boundary of this protected block nothing can be said at present ; this must chiefly depend on the possibility of making a bridle path across the hills from north to south. The areas along the upper boundary which are open to the exercise of rights may be excluded if fire-protection is extended. So far it will probably be necessary as in other divisions to close the forests against exporters at the beginning of the hot season, but it is hoped that this will not sensibly affect the revenue."

82. *Grazing.*—The grazing tax in the Sub-Himaláyan forests was one of the many miscellaneous items of revenue that descended to the British from former Governments.

The receipts on account of grazing and fodder grass in the Ganges Division in 1884-85 amounted to Rs. 2,937 ; the average for the past five years being Rs. 2,057. Grazing free of duty is allowed to right-holders (all hillmen) in the portions open to rights containing 18,106 acres, as per Appendix C., where it will be seen that the number of cattle thus admitted is 13,288, consisting of 504 buffaloes, 9,888 cows and bullocks and 2,896 sheep and goats. It is prohibited in the fire-protected areas and admitted in the remainder of the forests on payment of the authorized fees, which are as follows :—

Buffaloes	8 annas.
Cows and bullocks	3 „
Sheep and goats	½ anna.

Appendix D shows the number of cattle on which dues were realized in 1884-85 :—

	Cows and bullocks.	Buffaloes.	Goats.	Total.
"Gots" of Kumaunis, &c.	1,810	2,194	153	4,157
Gujars	82	1,001	35	1,118
Total ...	1,892	3,195	188	5,275

83. During the early winter and summer when the grass is dry and worthless, the cattle from the lower hills of Kumaun are driven to the Bhábar for pasturage, where they ramain from October until May Whilst there, inhabitants of neighbouring villages in the hills usually canton together and construct for themselves temporary sheds of boughs of trees with roofs of thatch or leaves called "gots" or cattle stations.

The cattle of the upper hills and of the greater part of Garhwál find pasturage all the year round in the upper hills themselves ; neither bullocks nor buffaloes are used for commercial transport, but they share with ponies and women the duty of carrying their owner's baggage in the annual migration to and from the Bhábar. The inhabitants of the lower pattis from the earliest times undoubtedly had recourse to the Bhábar, as at present, for grazing purposes, but these very pattis did not come into the possession of the Chands until the middle of the sixteenth century.

84. In the appendix an attempt has been made to show the number of cattle grazing in each compartment; but the details are probably in many instances erroneous from want of correct information, although as far as each block is concerned they may be regarded as tolerably correct and may be tabularized as follows :—

Name of block.	Area in acres.	Number of cattle.	Number of acres per head of cattle.	Remarks.
Cattle of right-holders.				
Sattikhala and Malan	4,390	2,768	1½	
Laldhang	4,277	1,082	4	
Amgadi and Bedasni	9,439	9,438	1	
Total ...	18,106	13,288	1·36	
Cattle on which grazing dues are paid.				
Gewai, Gowalgarh and Malan	7,266	610	11	
Sigadi	18,053	831	22	
Rawasan	5,933	143	41	
Luni	13,503	618	22	
Mundhal	9,401	377	25	
Dogadda	6,677	925	7	
Bedasni	6,304	121	...	Open to villagers' cattle also.
Kunau	8,145	1,650	5	
Total ...	75,282	5,275	14	

From this it appears that the grazing is much heavier in the parts open to rights than in the other portions of the forest, but it must be recollected that the villagers have forests and waste lands of their own besides the Government forests, which are in consequence not grazed over by village cattle to the full extent permissible. In the forests closed to rights it will be observed that the heaviest grazing is in the vicinity of the Ganges, and that elsewhere it is light, especially in the central part of the division. The number of acres per head of cattle appears very high in some cases, but i must be recollected that much of the ground is inaccessible, and that most of the grazing is confined to the flat ground and to the more moderate slopes.

85. *Wild animals.*—Elephants do far and away more damage than all other animals in the forest put together, and Dr. Schlich makes the following remarks about them :—" While on the subject of bamboos, I may draw attention to the great damage done by wild elephants. In many localities the animals not only pull down the young shoots, but they also uproot numerous clumps to make the leaves accessible to their young It seems to me that the preservation of wild elephants is only justifiable in remote localities, where it is not of much importance whether a few hundred square miles more or less of forest exists. In comparatively civilized parts like the sub-montane tracts of Kumaun and Garhwál, on the other hand, the elephants should either be caught at an early date and put to some use, or if this is impracticable they should be shot off. They not only destroy considerable areas of forest and make it a matter of some risk to enter those parts, but they do also considerable damage to the crops of the adjoining cultivated tracts of country. Besides damaging bamboos, they break down very many sál and other saplings when passing through the forests. There are probably over 400 of these huge beasts between the rivers Sarda and Jumna." Orders have now been issued permitting the shooting of rogue elephants under certain restrictions. Pigs and porcupines are very common, especially in the lower parts of the forests; they both uproot plants, being especially fond of kachúr, the roots of *zingiber elatum.* The latter also gnaw the bark of various species.

Monkeys and squirrels of several kinds are common ; they eat fruits and seeds and the latter also feed on flower buds, &c. Deer do little damage, but trees more or less completely barked by their horns are not uncommon.

86. Birds are mostly beneficial, by distributing seed of pulpy fruits or by checking the multiplication of insects, and therefore birds of prey should be kept down as much as possible, and the reckless destruction of birds for their plumage should be discouraged.

Insects.

87. *Insects.*—Mr. Thompson wrote a most useful report on "The Destructive Insects of Kumaun and Garhwál" in 1867, which is now unfortunately out of print, and this being the case, a very short summary will here be given of its contents as regards the most dangerous insects.

Buprestidæ are found underneath the bark of trees, their larvæ living on it and on the sapwood.

Lamellicornæ, stag-beetles, are common and are the most destructive of all beetles to living trees.

Rhyncophora, weevils, are very injurious by boring into the young stems and living upon their juices, and the smaller species belonging to the general Bruches and Rhynicites are highly detrimental to the reproductiveness of the forests. In 1863 entire seed-crops of sál were destroyed by them and partial destruction has occurred since.

Xylophagi.—These wood-eating beetles are called *ghun* by the natives, and are frequently found in great numbers in the white wood of sál and of all other species except haldu, whilst soft-wooded trees are attacked indiscriminately. The Bostricidæ are the largest beetles of the family. The Tormici are very destructive to bamboos. The Hylesini also attack the bamboos, but not so vigorously as the Tormici. A beetle of the former genus attacks chír in vast numbers, boring in all directions but chiefly towards the centre.

Longicornes.—A Cerambyx is perhaps the only species except the *ghun* which attacks sál in these forests, and this it only does in the case of dead or felled trees on which the bark has been allowed to remain. The grubs of this family are known under the vernacular name *makora*, and are found in the khair, tún, shísham, rauni, mango, chír and even other trees of which the sap possesses a penetrating odor. Sál

saplings suffer from another species of longicorn of which the larva cuts a way for itself in the young soft stem from the root to the highest point it can reach and destroys the young tree. Semal, soanjna and doldhak are attacked by a magnificent beetle, the Monochamus soanjna, whose larvæ do much injury in an incredible short space of time. A minute species attacks the living bark of the khair and may be detected by the gummy exudations it causes.

Lac, shell-lac.—This is the habitation of the pupa of the coccus larva, chiefly inhabiting dhák and several species of ficus. The trees sometimes perish from exhaustion owing to the millions of punctures made into their tender shoots by a colony of these insects.

Neuroptera, whiteants, are extremely destructive, but do not attack sál much. The haldu also escapes, especially when fresh, owing probably to a bitter principle found in the wood, and the heartwood of khair is not touched by them.

Hymenoptera.—There appear to be three varieties of xylocopa in these forests. The largest, X. purpurea, is very destructive to wood-work of buildings and also to dead wood of forest trees. A second variety is very fond of boring into the thick trunks of haldu. The flowers of the sain are often attacked by a cynips which produces small peppercorn-like galls in the place of the fruit.

Young leaves of the haldu are often eaten by the larvæ of a moth in such vast numbers as to strip the tree of all foliage, which, in that case, is usually renewed during the rainy season.

Turmeric (*Curcuma longa*) is singularly free from the attacks of wild animals and is often cultivated in jungles where nothing else can be profitably raised.

88. Creepers, *epiphytes and parasites*—Maljan (*Bauhinia Vahlii*) and Goj (*Millettia auriculata*) are by far the most abundant of all creepers found in these forests and do much damage by impeding the growth of young trees and making them crooked. Dense entangled masses of them closely covering the soil also check reproduction. They are most abundant in damp and shady valleys.

89. Epiphytic figs, such as *Ficus bengalensis, religiosa* and *cordifolia*, are common in the lower forests, and they of course eventually kill the trees on which they have in the first instance germinated. These trees, however, yield excellent fodder for elephants, and it would be a mistake to exterminate them altogether, at least in the neighbourhood of camping-grounds.

90. The commonest parasite is *Loranthus longiflorus* (banda) which eventually kills the branches on which it grows. Its bark is used for tanning in Oudh. One or two other species belonging to this genus also occur, but are much less common. The *Cuscuta* is chiefly found on zizyphus in scrub ber jungle.

91. *Past working.*—The sál forests do not contain many large trees at present, as they had been heavily worked before the advent of the Forest Department, so much so that all timber for the Chila rest-house had to be brought from the Garhwál Division.

Green sál has not been exported for a number of years, and the timber works are confined to fellings of second rate kinds of trees, and until last year to supplying a certain amount of poles to the Irrigation Department for the head-works of the main Ganges Canal. The cutting out of the best shaped and, in many cases, of the largest poles in the forest is not, Mr. Brandis says, in accordance with rational forestry ; but the quantity is so small in regard to the area from which these pieces can be extracted, that under careful management the supply of these poles should cause no inconvenience.

92. The unsatisfactory condition, however, of the stock occupying the chaurs, &c., in Kunau 4, 5, 6 and 7, where the density varies between 1 and 5, is probably due

in a great measure to excessive fellings for these head-works, combined with want of fire-protection and perhaps also to over-grazing.

93. There can be no doubt that more timber and firewood are produced over the entire area than the quantity sold annually, but that, on the other hand, some of the more accessible parts have been overworked, whilst large but more inaccessible areas have remained untouched.

The system of collecting the revenue through a kham tahsíl establishment, as at present organized, in no way tends to rectify this irregularity in working, as will be seen from the following remarks and observations made in the Government of India letter No. 491 F., dated 20th May, 1883 :—"When the system of collecting forest revenue in Kumaun and Garhwál was first started, it may have been well-adapted to the requirements of the case, but as the demand for forest produce increases and approaches the limit of the ordinary capabilities of the forests, it is necessary that the resources of the latter should be more carefully husbanded, and especially that a general an rapid reproduction of he produce removed should be ensured. As the kham tahsíl system is entirely separated from the general forest conservancy staff, the latter have no means of ascertaining the number of people who enter the forests, the quantity of produce removed, or the particular locality where it is cut, unless they happen to come across the exporters while in the act of cutting the produce, or are otherwise indirectly made acquainted with what goes on within the area of their charges. Hence it was considered that proper arrangements could not be made for reproduction. Besides, the working of the forests must be unequal, a run being made on some localities while little or no produce is removed from others. Under these circumstances it appears that the present system will affect seriously, in course of time, the condition of the forest; and it is very desirable to effect a change by which the control of the operations for the cutting and removal of the forest produce shall be made over to the staff which is responsible for the protection, reproduction, and improvement of the forests."

The overworking of the bamboos, especially in the more accessible forests along the foot of the hills, had been noticed in the para. devoted to that product, and nothing more need be added here.

CHAPTER VII.

Population in and around the Working Circle.

94. In the Bhábar and Tarái most of the people are Bhuksas, similar in character to the Thárus of the Eastern Tarái, and from the time of the Kumaun rulers these tracts have been steadily growing in importance. From the Musalman historians and the traditions of the plains tribes, we gather that in the eleventh century they were covered with dense forests interspersed with patches of grazing and cultivation. The people were chiefly occupied in pasturing cattle, the scanty cultivation being barely sufficient for their wants. Rude temporary dwelling places were the rule, but here and there were parts to which the graziers could fly in time of danger.

95. The population being essentially Hindu, the vegetable kingdom affords most of the substances used as food by the people. Few of the hillmen, however, even among those who have had much communication with the plains, have any prejudice in regard to eating animal food, and with but few exceptions all eat the flesh of deer, pheasants and patridges, but not of jungle fowl. The servile classes (Doms, &c.) eat meat of all kinds whenever they can get it, even of animals killed by wild beasts or which have died from disease, and in their habits differ little from the chamárs of the plains. Uncultivated products are used as food chiefly by the inhabitants of the jungly tract adjoining the Government forests, and in times of scarcity by the people of the upper pattis. At all times, however, the young leaves of nettles, of several species of ferns, sorrel and the like, are used as spinach by all classes.

96. During the cold weather the forests present a busy scene. They are then filled with wood and bamboo-cutters, laborers hauling out timber, men and women collecting bábar grass, making mats and baskets, gathering roots, leaves and plants used in medicine or the arts, or herding cattle. The exporters are chiefly Garhwális, who come down from the hills, establish themselves in a certain valley, cut and collect the forest produce, and sell it either at their camping-grounds or at certain bázars, such as Kotdwar and Laldhang, to the exporters, who all come from the low country. After April all except those who have become acclimatized leave the forests and during the rains they remain practically closed. Labor may be said to be plentiful from November to the end of March.

97. There were only two forest offences tried before a Magistrate in 1884-85, resulting in a conviction in one case and acquittal in the other; 25 cases were compounded by the divisional officer, two being for injury to the forests by fire, 19 being for unauthorized fellings, &c., of forest produce, and four for other offences.

Village rights.

98. The hillmen are the only people who possess any rights in these forests, and a list of villages with a description of the rights which they enjoy is given in Appendix F, whilst a list of cattle, which they are allowed to graze free of duty, is given in Appendix C, (the word right is here used as a convenient term and not in contradistinction to privilege). These rights are, however, confined to certain portions of the forest only, which were marked off on the maps for the whole of the Bhábar forests by a committee held at Rámnagar on the 23rd of January, 1879. There are five such portions open to rights in the Working Circle, *viz.*:—

Number of block.	Name of block open to rights.	Areas in acres.
Old Forest Block No. 3	Sattikhala	2,254
Ditto " "	Malan	2,136
Ditto " 4	Laldhang	4,277
Ditto " 5	Amgadi	3,135
Ditto " "	Bedasni	6,304
	Total ...	18,106

With the sole exception of the right "fodder grass for sale" these rights are limited to the actual domestic and agricultural requirements of the villagers for whom they are recorded, and they cannot be exercised in any way for purposes of sale. If in any case there is no fallen wood available for firewood, the Forest Department must arrange for a supply. The maximum size for a house for building and maintaining which timber can be claimed is 40 (forty) feet × 36 (thirty-six) feet × 16 (sixteen) feet. Any trees may be lopped for green leaves, except the protected kinds mentioned in Appendix F; but the lopping is limited to branches not exceeding two inches in diameter. The hill people have the privilege of taking up baskets, sieves, mats and such like petty articles manufactured at Kotdwar and Chaukighata for their own use free of duty. The Appenda to the record-of-rights sanctioned by G. O. No. 356 of 22nd May, 1882, gives a list of villages entitled to water for mills in various streams in the forest.

CHAPTER VIII.

Demands for produce.

99. Mr. Brandis, writing in 1881, says:—"Sál, khair, sandan, tún, gosam and shisham are not the only marketable woods in the Gori range, there being a very great demand for many other kinds: sain jaman, haldu, kaim, amaltas, dhaura,

bakli, bahera, jhigna. There is also a demand for semal floats for heavier woods on the bank of the Ganges ; indeed, this year I was informed that there was a demand for every kind of wood provided it is large enough to be sawn up into karis. It is quite possible that this demand may continue, and in this respect the forests near the Ganges are in an entirely different and much more favourable position than those of the Kumaun and Garhwál Divisions. In Udepur the demand for other kinds is not so great as in the Gori range, on account of the greater distance of the Ganges, but the local officers believe that there would be no difficulty in selling whatever timber might be cut of sain, jaman and haldu.

As an instance of the demand which exists for timber of other kinds, may be mentioned an arrangement lately made with some timber merchants from Meerut for the sale of 40,000 cubic feet of timber of different kinds in scantlings of from 8·15 feet long, cut and delivered by the Forest Department.

The annual yield of green timber has not yet exceeded 50,000 cubic feet from the whole of the Ganges Division, which is a small quantity considering the total area (90,560 acres) ; but there seems good ground for believing that the demand for all kinds of timber is increasing and may increase very largely.

It is of course most desirable that the forests should meet this demand to the fullest extent which their condition permits, but of the total area a very large proportion is precipitous ground, or for other reasons unavailable for export, and on considering the matter in detail it will probably be found that the area available to supply this demand is very limited.

100. The following statement shows the yield of these forests from 1872-73, as accurately as the data available will permit.

These returns are a fair criterion of the demand for dry wood, grazing and minor produce. In the case of bamboos the demand exceeds the supply, and this is also the case for sál and some of the other valuable woods. Owing to the fact that the sál forests have been overworked, a rule has been in force for many years prohibiting the cutting and removal of all green timber (except khair for pestles) save by special permission, and in the Annual Forest Notice for 1884-85 it was further forbidden to cut khair from the roots.

The making of cutch and charcoal was also forbidden.

Year.	Kind of tree.	Number of trees.	Cubic feet.	*Other forest production.*		Remarks.
				Kind and quantity.	Revenue.	
	Green wood.					
1872-81.	Bakli	123	2,539	...	...	All the timber came from the Gori range with the exception of 20,920 cubic feet of kokat sent from Udepur to a depôt in the plains.
	Sain	5,168	142,140	No data available.		
	Shisham ...	6,497	9,528			
	Other kinds ...	73,413	234,532			
	Total ...	85,201	388,739			
	Average annual yield,	10,650	48,592	...		
	Dry wood.					
	Sál		15,487	...	...	Includes the yield of Chandi, from 1st November, 1880.
	Other kinds ...		31,115	...	...	No data procurable for previous years.
	Total ...		46,602			

Year.	Kind of tree.	Number of trees.	Cubic feet.	Other forest production. Kind and quantity.	Other forest production. Revenue.	Remarks.
	Green wood.				Rs.	
1881-85,	Sál	109	1,934		...	In 1884-85 the returns were as follows:—
	Sain	1,415	40,902	Mds.	...	
	Shisham ...	45	1,800	Fuel, 73,362.	1,666	Green wood 28,793 c. ft.
	Sandan ...	50	750	Bamboos 9,352,862.	34,369	Dry wood 15,957 Fuel wood 73,147 mds.
	Tún	4	177	Grazing.	2,185	Bamboos, 7,483,304 No.
	Jaman	103	2,758	Other minor produce.	2,546	Grazing, 2,937 Rs. Other minor produce 2,785 Rs.
	Khair	...	8,164	...	...	
	Oher trees ...	40,322	116,663	...	...	8,910 cubic feet of green wood of other kinds was sold from the Chandi forest this year.
	Total ...	42,048	182,148			
	Average annual yield,	10,512	45,537	...	...	The decrease under timber is chiefly due to the fact that no timber was supplied for the Ganges Canal, and under bamboos it may be attributed to overcutting.
	Dry wood.					
	Sál		36,481			
	Sain		31,290			
	Shisham ...		22,000			
	Sandan ...		6,637			
	Tún		120			
	Semal		4,800			
	Other kinds ...		17,859			
	Total ...	...	119,247			
	Average annual yield,	...	29,812			

101. *Timber for the Ganges Canal.*—Mr. Brandis makes the following remarks in his suggestions of 1881 regarding this matter.

"It will be noticed that a large item in the annual yield of this division is for wood supplied to the canal works.

"This wood is used for the construction of the temporary head-works, for which none but straight poles from 10 to 30 feet in length can be employed, but they may be of any kind of wood. After fire-protection has been successfully continued for some time, there ought to be no difficulty in supplying the quantity required for this purpose, which fluctuates between 5,000 and 20,000 pieces a year. Each piece is a young tree, and only well-grown poles are used for this purpose. The cutting out of the best shaped and in many cases of the largest poles in the forest is not in accordance with rational forestry; but the quantity is so small in regard to the area from which these pieces can be extracted, that under careful management the supply of these poles should cause no inconvenience.

"The forests from which these poles may be supplied at the present rates are those situated north of the Hazara Sot, the Ghasiram valley and the Dehlighâta range. Of the total area, however, within these limits, which is approximately 30,000 acres, a portion only is sufficiently accessible to furnish these poles at rates remunerative to the contractor who undertakes the work. I am of opinion that if fire-conservancy is extended at an early date over the greater part of the Gori range in the manner here suggested, it will be possible without injury to the forests to continue this supply, but the matter requires careful consideration, and these operations should not be made at haphazard but in accordance with a regular and carefully considered plan. So much is clear, that the protection of these forests from fire is a necessity."

102. The average annual quantity of timber supplied by departmental agency for these works between 1872 and 1884 is as follows:—

	No.	Cubic feet.
Kokat ballas, ballis and tors with only a little shisham	11,955	29,052

and the average annual revenue between 1879-84 was Rs. 7,203.

The rate paid per score varied, but for the last few years it may be roughly stated to average for—

	Rs.
Kokat ballas	40
" ballis	10
" tors	8

and it is open to question whether it would not be more remunerative to allow these young trees to come to maturity and then saw them up.

A considerable quantity of timber for these canal bunds has also been obtained from the Dehra Dún Division, but during the past five years nothing was supplied from the Dehra Dún except in 1881-82 and in 1884-85, while in the latter year no timber was supplied from the Ganges Division.

The rates charged last year by the Dehra Dún Divisional Officer were as follows:—

Description of timber.	Class.	Quantity. Scores.	Quantity. Pieces.	Rate per score.	Amount.
				Rs.	Rs. a. p.
Kokat ballas	1st	3	3	50	157 8 0
Ditto	2nd	13	15	45	618 12 0
Ditto	3rd	23	12	40	944 0 0
Ditto	4th	17	4	35	602 0 0
Kokat tors	1st	58	5	10	582 8 0
Ditto	2nd	178	...	9	1,602 0 0
Ditto	3rd	183	5	8	1,466 0 0
Kokat ballis	1st	16	9	12	197 6 5
Ditto	2nd	86	19	11	956 7 2
Ditto	3rd	70	18	10	709 0 0
Total ...	...	...	...	...	7,835 9 7

In 1881-82 the timber was removed by the Canal Department from the forests, whereas in 1884-85 it was delivered by the Forest Department at Bhimgoda.

Pial (*Buchanania latifolia*), jhingan (*Odinawodier*), Pula (*Kydia calycina*) and kura (*Holarrhena antidysenterica*) are not accepted for this purpose.

The unsatisfactory state of the Kunau chaors and of the compartments in the Mundhal block facing the Ghasiram-ka-sot is probably to be attributed, in a great measure, to their having supplied a large quantity of these poles, although no definite information can be obtained on this point.

103. The divisional officer considers everything saleable within a short distance of the Ganges, and that there would be no difficulty in selling any quantity of first class timber wherever the trees might be marked except in the more inaccessible parts towards the upper forest boundary.

104. In appendix G will be found the rates charged on timber of all descriptions during 1885-86.

The rates on bamboos and minor produce were given in the paragraphs relating to the subjects.

CHAPTER IX.

Lines of Export, Depôts, &c.

105. The main lines of export are the forest roads, some of the larger streams, and the Ganges. A list of the forest roads is given in appendix K.

106. Owing to the absence of roads and to the precipitous nature of the forests, export is very difficult from the following compartments, the limit between these and the more accessible compartments being marked on the map by a broad red line:—

	Compartments.	Number of acres.
Udepur ranger,	*Sattikhala 1, 2 and 3	2,254
	Gwalgarh 5	690
	*Malan 2	928
	Sigadi 9, 17, 18, 19 and 22	3,601
	*Laldhang 1, 2, 3, 4 and 5	4,278
	Rawasan 3, 4 and 5	3,057
Gori range ...	Luni 1, 3 and 8	3,856
	*Amgadi 1, 2 and 3	3,135
	Dogadda 1	802
	*Bedasni 3 and 4	1,909
		24,510

* These forests are open to rights.

or over 38 square miles.

107. The control of the floating on the Ganges is now in the hands of the Dehra Dún Forest Officer, and river rules have been prepared, but have not as yet been sent up to Government. When they are sanctioned all traffic by water at Hardwár or at Dudhia, and possibly lower down, will be checked, but no fees will be levied or rafting passes issued.

108. The extension of the main line of the Oudh and Rohilkhand Railway from Moradabad to Saháranpur, which was only opened last year, will probably be the means of opening out fresh markets for the produce of these forests, as the station of Najibabad is only 13 miles from Kotdwar and 11 miles from Haldukhata.

The rates at present in force for the carriage of forest produce by rail are as follows :—

Long timber, logs, rough or sawn ballis, posts, and other timber and bamboos which cannot be loaded in a covered truck, will be carried in trucks and charged at low class rates on actual weight, subject to a minimum charge of annas 2 pies 3 per mile per truck employed :—

Sál timber	@	30 seers per c. foot.
All other timber	@	20 „ „

Sleepers when despatched by special train are charged for at seven pies per ton per mile, subject to a minimum load of six tons per truck or wagon. The minimum weight for charge, six tons per truck or wagon, is extended to despatches of firewood by ordinary as well as by special train. The low rate is one-fourth of a pie per maund per mile.

109. *Depôts.*—From the annual forest notice for 1884-85 it appears the following depôts were open from the 1st November, 1884, to the 15th June, 1885, for the check and collection of dues on produce exported.

Revenue Depôts.

Name.	Blocks from which the produce chiefly comes.
1 Kotdwara	Gewai, Sattikhala, Sukrau, Gwalgarh.
2 Kauria	
3 Haldukhata	Mahan, Sigadi (principally compartments 14—22)
4 Papidanda	Sigadi (principally compartments 4—13 and Laldhang 1—4.)
5 Laldhang	Sigadi (principally compartments 1—3) Laldhang 5, Rawasan and Luni (principally 1—5.)
6 Peli (in Chandi)	Luni (principally compartments 6—11) and Amgadi.
7 Chila	Mundhal, Jogi chaor, Ander Majhera, Amgadi 2 and 3.
8 Gori	Bedasni 1—5, Kunau, Dogadda, Kauria chaor.
9 Lachmanjhula	Bedasni 6.
10-15 Naluwala, Amsot, Tatwala, Shampur, Shishamghat and Chandi.	Chandi forest.

Appendix H gives the amount of revenue under the various budget heads realized at these depôts during the year 1884 85, omitting the Chandi ones, from which it will be seen that Gori, Laldhang, Peli and Chila are the most important of the revenue depôts, all having received over Rs. 5,000, while at Lachmanjhula only the paltry sum of Rs. 60 was received and at Haldukhata Rs. 526 only.

It will be seen that nearly all the firewood comes from the forests near the Ganges, as of Rs. 1,411 received as revenue over Rs. 1,200 were realized at Gori. The principal depôts for bamboos are Laldhang, Gori, Peli, Papidanda and Chila, whilst most of the minor produce passes through Kotdwar, Peli and Haldukhata.

110. The 11 partál or check depôts are all situated in Bijnor; their names are Chandanpura, Jateiwala, Sanpur, Larhpur, Asafgar, Chauraha, Ghoslon, Panchaki, Jwalapur, Nali, Dam Mayapur and Dudhia. The produce and receipt passes are checked at these places and export, save by the routes on which they are situated, is forbidden. All passes issued for produce at revenue depôts not presented with the produce within the periods of time noted below at the different check depôts are charged with the following additional dues: —

Passes of Re. 1 or less, 8 annas each.
Passes above „ 1 1 rupee „

The time allowed for the presentation of revenue depôt passes at the check depôt is as follows:—

Jwalapur Nali ... ... } For Chila, Chandi, Shishamghat and Peli, 4 hours.
Dam Mayapur ... ... }
Panchaki, Chauraha ... ... }

All other check depôts for export by land, 24 hours.
Ditto ditto by water, 12 „

Passes and produce detained by accidents to carts, &c., are exempt from this due.

111. *Buildings.*—There are two rest-houses for officers, *viz.*, a first class one at Chila recently erected, and an old rest-house at Kotdwara.

All the sál timber required for the Chila rest-house had to be brought from Garhwál at a cost of Re. 0-11-3 per cubic foot.

A new pucka depôt building has just been built at Laldhang, but all the other depôt buildings are temporary only.

There are no wells.

112. *Camping grounds.*—There are numerous camping-grounds throughout the forests; but camels cannot go beyond the red line on the map, showing the boundary between the accessible and inaccessible forests. There are small, but flourishing, mango groves at Chila and Haldukhata, and there is also a garden at the latter place.

There are double-roofed thatched rest-houses on the Ganga Ram chaor near Gori and at Haldukhata.

The Haldukhata paráo of eight acres demarcated by five pillars, and outside the present forest boundary, was the property of the Forest Department before the land was broken up for cultivation and was subsequently demarcated. The Laldhang camping-ground below the road is not forest land, but belongs to Bijnor.

CHAPTER X.

FORMATION OF RANGES, BLOCKS AND COMPARTMENTS, AND VALUATION SURVEY.

113. *Ranges.*—Two ranges have been formed, *viz*, the Udepur range containing 52,418 acres from the Kho to the watershed dividing the Mitawali Sot from the Mundhal nadi, but excluding Amgadi 1, and the Gori range, containing 37,978 acres, and comprising all the forests in British Garhwál to the west of this watershed and including Amgadi 1 to the east.

The latter range, although the smallest in area, is the most important, as it is nearest the Ganges, so that there is a ready sale for all kinds of trees, but the largest export of bamboos is from the Udepur side.

114. *Blocks.*—These ranges have been divided into blocks as follows :—

	Name.	Area.	Number of compartment.	Remarks.
UDEPUR.	Giwai	1,695	3	Between the Sukrau block and the Kho.
	Sukrau	1,132	2	Protected from fire.
	Sattikhala	2,254	3	Open to rights.
	Malan	2,136	2	Ditto.
	Gwalgarh	3,435	5	Between the Sukrau and Malan blocks.
	Sigadi	18,053	22	Part of the basins of the Malan nadi, Teli, Sigadi and Chamaria Sots.
	Laldhang	4,277	5	Open to rights.
	Rawasan	5,933	7	Upper basin of the Rawasan.
	Luni	13,503	11	Upper basins of the Luni and Mitawali Sots (except Amgadi 1).
	Total ...	52,418	60	
GORI.	Amgadi	3,135	3	Open to rights.
	Mundhal	9,401	12	Basins of the Mundhal, except Amgadi 2 and northern half of the basins of the Ghasi Ram Sot.
	Jogi chaor	788	1	Protected from fire.
	Ander Majhera ...	1,410	2	Ditto.
	Dogadda	6,677	7	Parts of the basins of the Luni and Dogadda Sots of the Bheng nadi and islands in the Ganges.
	Kauria chaor	2,118	2	Protected from fire.
	Bedasni	6,304	6	Open to rights.
	Kunau	8,145	7	Between the Bedasni block and the Ganges north of the Bheng nadi.
	Total ...	37,978	40	

The points considered in forming these blocks were, that an entire block should be either open or closed to rights, and either open or closed to fires, and that it should contain as far as possible the complete basin of one or more of the main streams.

115. *Compartments.*—These blocks have been divided into 100 compartments, containing on the average 904 acres, or rather less than 1½ square miles.

In forming these compartments the paramount consideration was that the compartment should form the unit of working.

On examining the map it will be found that the compartments generally contain the whole or a portion of the basins of one or more tributaries of the main streams, and are thus bounded by prominent ridges and by the main streams themselves. Owing to the extreme irregularity of the forests, the kind of stock, the nature of the soil, &c., could scarcely be taken into account in choosing boundaries, although it will be found that, as the general aspect often entirely changes from one basin to the next, there is often a marked difference in the stock, soil and climate of adjoining compartments, *e.g.*, in Mundhal 7 and 8.

116. *Valuation Survey.*—The stock being very poor, it was considered sufficient to conduct enumeration surveys only over well-distributed sample areas, aggregating on an average 4½ per cent. of each compartment.

The sample areas represented as nearly as practicable average types of stock, although the greater portion of the forest being situated on very precipitous ground, often only two or three acres could be chosen in one place.

A complete enumeration was made of the shisham and khair along the Sigadi, Luni, Mitiwali and Dogadda Sots, as well as along the Bheng nadi and in the islands of the Ganges. Every tree in the sál plot of 225 acres in Luni 6 was also counted. Owing to the great accessibility of a large portion of the forest, due to the proximity of the river Ganges and of the Ganges Canal, many species of trees, which have no value further away from the river, except as mere firewood, are here exported as timber.

For this reason and on account of the small quantity of sál in these forests, the following trees besides sál, sain, shisham, khair and chír have been counted separately:—bakli, jaman, haldu, dhaura, gosam, tendu and sandan. All other species have also been counted, but collectively under the denomination of other species (kokat).

The trees were divided into four diameter classes, differing from each other by 6″ as follows :—

Class IV.	...	...	...	...	...	6″	12″
„ III.	...	...	...	...	...	12″	18″
„ II.	...	...	...	...	...	18″	24″
„ I.	...	...	...	...	...	over	24″

In the last three classes the sound and unsound trees were numbered separately.

The proportion of unsound trees is, however, probably much greater than that given by the valuation survey, as the gaugemen were not sufficiently skilled to determine whether trees to all outward appearances sound were really so or not, and they were in consequence only ordered to mark as unsound trees those which showed visible signs of decay.

The field work occupied 3½ months, *viz.*, 41 days in 1883-84 under Mr. Broun and 62 days in 1884-85 under myself. Four survey parties were employed in the first season and seven in the second. The average daily outturn was—

Per survey party	...	...	10·7 acres surveyed. 736 trees counted.
Per gauge	...	...	1·3 acres surveyed. 92 trees counted.

Each enumeration survey party consisted of a recorder and eight gaugemen, and their work was usually under the immediate supervision of the students from the Forest School. Whilst the survey parties were employed on enumeration work as detailed above, the officer in charge went over the various compartments and briefly described them, taking notes about the configuration and slope of the ground, the nature of the soil, and of the forest growth ; its quality and density, the abundance and general appearance of the reproduction ; whilst particular attention was paid to the abundance or otherwise of bamboos, which form the chief source of revenue derived from these forests. In the succeeding chapter the description of each compartment is given in a tabular form. The varying density of the stock and the state of the reproduction has been expressed by coefficients varying from 1 to 10, 10 denoting a complete stock or complete reproduction. Besides the density, the quality also has been represented by means of similar coefficients, 10 denoting the highest quality. Under this term is included the size, shape, vigour and soundness of the trees. It has only been found possible to insert the altitudes in the cases where the 4″ to the mile maps have been printed. The other points connected with the examination and description of the

soil and growing stock need no explanation. The average number of acres thus examined and described by one officer daily was 1,493.

117. The total cost of the survey up to the end of March, 1885, was Rs. 4,902, or "on an average" Rs. 65-8-0 for every 100 acres actually surveyed, 9½ annas for every 100 trees counted, and 1 anna per 100 acres for the whole working circle.

118. The estimation of the actual contents of each compartment from the results of the valuation survey was a very long and tedious process.

The sample plots in each compartment had to be grouped together according to the nature of the contents as explained in para. 36.

The areas stocked similarly to these groups had then to be calculated by means of the planimeter, deductions being made for precipices, blanks or other unworkable portions of the forest; and as the sample plots had to be selected where the stock was somewhat above the average, some allowance had also to be made on this account.

The contents of the sample plots included in each group had then to be multiplied by the ratio between the areas thus obtained and the areas of the corresponding groups of sample plots, the results being the contents of each similarly stocked area, which on being added together, give the contents of the whole compartment. The calculations for every compartment would by themselves occupy a volume, and here it must suffice to give one example showing how they were made.

In Luni 4, containing 1,202 acres, sample plots aggregating 82 acres were valued.

The plots are shown on the map as *a, b, c, d, e, f, g, h, i, j, k, l,* and the details of their valuation survey are as follows:—

Name of species.	IV. Class.	III. Class.		II. Class.		I. Class.		Total.	Number of plot.	Number of acres.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			
Sál	15	3	...	...	...	...	...	18	*a*	10
Sain	1	...	...	...	...	...	...	1		
Haldu ...	...	...	...	...	2	1	...	3		
Dhaura ...	11	3	3	4	3	4	6	34		
Bakli	31	10	1	1	1	2	1	47		
Gosam ...	7	2	1	...	...	...	...	10		
Khair... ...	54	2	1	...	...	...	...	57		
Jaman ...	1	...	...	...	...	...	...	1		
Sandan ...	9	...	...	...	...	...	...	9		
Tendu ...	29	2	...	...	...	...	...	31		
Kokat ...	183	36	4	11	1	3	...	238		
Haldu ...	...	...	...	...	...	...	1	1	*b*	4
Dhaura ...	1	1	...	...	...	3	...	5		
Bakli... ...	10	1	...	5	...	1	...	17		
Gosam ...	11	7	...	...	...	...	...	18		
Khair... ...	34	1	...	...	...	...	...	35		
Sandan ...	5	...	...	...	...	...	...	5		
Tendu ...	19	...	1	...	...	...	...	20		
Kokat... ...	61	7	...	...	...	5	...	73		
Sál	166	20	...	20	2	4	2	214	*c*	10
Sain	2	...	...	...	...	1	...	3		
Haldu ...	...	...	...	...	1	...	...	1		
Dhaura ...	3	2	...	3	...	...	...	8		
Bakli ...	19	4	1	6	2	1	1	34		
Gosam ...	3	...	...	...	...	...	...	3		
Khair... ...	1	...	...	...	...	...	...	1		
Sandan ...	129	...	...	...	...	...	...	129		
Tendu ...	31	1	...	...	...	...	...	32		
Kokat ...	418	15	3	1	1	...	...	438		

Name of species.	IV Class.	III. Class.		II. Class.		I. Class.		Total.	No. of plot.	No. of acres.
		Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			
Sál	4	...	...	1	...	1	1	7	*d*	1
Dhaura	1	1	...	...	1	...	1	4		
Bakli	7	...	...	...	...	...	...	7		
Sandan	19	1	...	...	...	...	...	20		
Tendu	8	1	...	...	1	...	...	10		
Kokat	72	8	1	...	...	1	...	82		
Sál	43	1	1	...	...	...	...	45	*e*	10
Sain	1	1	...	...	...	1	...	3		
Haldu	1	1	1	...	...	...	...	3		
Dhaura	4	...	...	...	...	1	...	5		
Bakli	17	5	1	18	3	3	3	50		
Gosam	9	1	3	...	1	...	...	14		
Khair	16	...	1	...	...	...	...	17		
Sandan	61	2	1	...	...	...	...	64		
Tendu	91	3	4	...	...	...	...	98		
Kokat	254	13	6	1	...	...	...	274		
Sál	...	2	...	...	...	...	...	2	*f*	6
Sain	3	1	...	1	...	...	...	5		
Haldu	2	...	...	...	...	...	...	2		
Dhaura	2	...	...	...	...	...	...	2		
Bakli	15	3	...	1	...	1	...	20		
Gosam	8	...	...	...	...	...	...	8		
Khair	21	...	...	...	...	...	...	21		
Sandan	5	...	...	...	...	...	...	5		
Tendu	12	...	...	...	...	...	...	12		
Kokat	171	8	2	4	1	...	1	187		
Sál	159	15	...	7	...	3	1	185	*g*	7
Sain	...	1	...	2	...	...	...	3		
Dhaura	...	...	...	...	...	...	1	1		
Bakli	1	...	...	...	...	...	...	1		
Jaman	1	...	...	...	...	...	...	1		
Sandan	33	...	...	...	1	...	...	34		
Kokat	155	12	1	1	...	...	...	169		
Sál	98	29	2	15	1	4	1	150	*h*	7
Sain	8	16	1	16	1	8	2	52		
Dhaura	1	3	...	...	...	...	...	4		
Bakli	1	...	...	...	...	...	...	1		
Gosam	...	...	...	1	...	...	...	1		
Jaman	2	1	...	...	1	...	...	4		
Sandan	42	1	...	1	...	...	...	44		
Tendu	3	...	...	...	...	...	...	3		
Kokat	168	9	2	...	...	...	...	179		
Sál	86	11	1	7	2	1	1	109	*i*	6
Sain	1	...	...	...	...	...	...	1		
Dhaura	3	...	...	...	...	...	...	3		
Bakli	2	4	1	...	...	1	1	9		
Gosam	1	1	...	...	...	...	...	2		
Sandan	55	...	...	...	...	...	...	55		
Tendu	4	...	1	...	...	...	...	5		
Kokat	150	18	3	1	...	...	...	172		
Sain	1	...	...	...	...	...	...	1	*j*	8
Haldu	...	1	...	...	...	...	1	2		
Dhaura	3	3	...	...	...	...	...	6		
Bakli	1	1	...	...	...	...	...	2		
Gosam	7	2	...	...	...	...	...	9		
Shisham	1	...	...	...	...	...	...	1		
Jaman	...	1	...	3	...	...	...	4		
Sandan	1	...	...	...	...	...	...	1		
Kokat	234	48	11	7	6	6	2	314		
Sál	116	6	...	5	...	2	1	130	*k*	3
Sain	...	1	...	...	...	...	...	1		
Dhaura	5	...	...	...	...	...	...	5		
Bakli	4	1	1	...	...	...	...	6		
Sandan	11	1	...	...	...	...	...	12		
Kokat	75	7	4	1	...	...	...	87		
Sál	242	15	5	11	2	1	...	276	*l*	10
Sain	2	8	...	3	...	2	...	15		
Haldu	4	2	...	...	3	...	2	11		
Dhaura	4	...	...	...	...	...	...	4		
Bakli	39	11	...	1	2	1	...	54		
Jaman	8	8	1	2	1	...	...	20		
Sandan	31	4	...	...	...	...	...	35		
Kokat	158	28	2	3	...	...	1	192		

The plots were then grouped together, and the area stocked similarly to each group was then estimated as follows :—

	No. of plots.	No. of acres.	Multiplying factor.
Kokat and khair ...	*a*, *b*, ...	64 ...	4·6
Sál and kokat ...	*c*, *g*, *i*, *k*, *l*, ...	540 ...	15
Sál, kokat and sain ...	*h*, ...	77 ...	11
Kokat and sál ...	*d*, *e*, *f*, *j*, ...	429 ...	16·5
Precipitous unworkable ground, river beds, &c. ...		92 ...	...
	Total ...	1,202 ...	...

The contents of the plots included in each group were then multiplied by the above factor representing the proportion of the total area of each kind of forest to the area actually valued, and the results being added together gave the figures shown in appendix I, where the estimated contents of all the compartments are given separately.

CHAPTER XI.

Description of Blocks and Compartments.

119. It has been considered inadvisable to write long and tedious descriptions of each block and compartment, and instead an attempt has been made to give all necessary particulars as briefly as possible in the following tabular form, the general description for each block being a summary of the description of the compartments it contains.

Description of Blocks (Gori Range).

Name of block.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
I. Giwai ...	1,695	This block is bounded on the east by the Kho nadi, on the west by the Giwai Sot and the boundary between the open and close forest, on the north and south by the outer forest boundary. The largest part drains into the Kho nadi and the slopes are, as a rule, steep, rugged or precipitous, save a few gentle slopes, which were formerly under cultivation, and some flats along the Kho. The main aspect is south-east, but about one-half of compartment 1 faces the Giwai, the aspect being south-west or west and the slopes moderate in the south-west corner.	Generally 30° or over.	1,132′-3,300′	Mainly sandstone with some marl in places, especially in the south-west corner, and a little alluvium along the Kho.	Mixed sál forest predominates, but with the exception of the more moderate slopes, the sál is usually crooked and of very inferior quality. With the sál there are a large number of kokat, such as kat-bhilawa, &c. Sain occurs everywhere in small numbers; it is particularly abundant up the Gujrari nála and replaces sál on marly ground, although almost absent in the south-west corner of the block, where kokat predominates mixed in places with a little sál and west of the bungalow with a good deal of gosam: sandan, dhaura and bakli are usually mixed in equal proportions, but nowhere occur in notable numbers, whilst near the streams jaman, gosam and haldu are frequently met with. Bamboos of inferior quality are scattered throughout the block and are overcut in the more accessible places.	Of sál 5 in the best places, otherwise of poles 4, large trees 2 to 3.	In the better stocked parts 4 to 7, elsewhere frequently 2 only.	In many places destroyed by fire, but in those places which have escaped there is a fairly abundant advanced growth of sál, sain and kokat.	To be fire-protected, selection fellings to be made according to the plan and thinnings where necessary; climbers to be cut.
II. Sakrau ...	1,132	Bounded on the east by the Giwai sot, on the west by the Sukrau, on the north by the boundary between the open and closed forest, and on the south by the outer forest boundary. About two-thirds of the block is a raised plateau, inclining gently to the south-east or south-west, whilst in the north there is hilly ground with moderate slopes.	In the hilly ground from 10° to 20.°	...	On the plateau alluvium overlying marl, the former being very shallow in the upper portion. The slopes consist of sandstone and marl with some alluvium near the bottom.	Variable. In the hilly ground and in the upper portion of the plateau there is an open mixed forest with some sál, which gradually becomes more numerous until it predominates about the centre of the plateau, where it forms at times a pole forest. A large proportion of the big trees are unsound The predominance of kokat in the upper portion of the plateau is probably due to former fellings. Bamboos are found throughout the block, but are most abundant on the west and south edges. They have been much injured by wild elephants.	4 to 6 ...	3 to 6 of pole forest 8.	Variable, sál seedlings abundant in places, whilst kokat seedlings, such as rauni and kat-bhilawa, occur everywhere.	Fire-protection to be continued. Selection fellings to be made according to the plan and thinnings where necessary. Climbers to be cut.

Description of Blocks (Gori Range)—(continued).

Name of block.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
III. Satti Khala.	2,254	Bounded on the east by the Sukhrau block, on the west, and south by the Gwalgarh block, and on the north by the outer forest boundary. Comprises the upper portions of the basins of the Sukhrau and of the Giwai Sot. The streams run more or less southerly and the principal aspects are east and west. The ground is usually much cut up by numerous ravines and gullies, giving a very rugged appearance to the block. In the south-east and on the right bank of the Sukhrau there are some long terraces formerly cultivated. The slopes on the east face of the spur running from the Satti Khala to the junction of the Giwai and Jawargarh sots are moderate.	Usually over 30.°	...	Alluvium in lower portions near streams, soil deep; elsewhere soil superficial, rock of sandstone and marl, the former predominating.	Very variable; a mixed sál forest is found in the north and east of the block, the sal being of very fair quality on the more even slopes. In the north-west is an open mixed forest with a fair proportion of tolerable good sain, together with kokat and some sál, bakli, sandan, jaman, haldu, &c. On the marl and alluvium of the lower slopes and in very rugged places there is an open mixed forest, containing chiefly kokat, but on the left bank of the Giwai Sot, dhaura and bakli are abundant, mixed with kokat or sál. Scattered bamboos of inferior quality are found throughout the block, but they are more abundant in the north-west corner. Wild elephants have damaged them considerably.	In the best places sal and sain 4 to 5.	Open forest 1, 3 to 4; elsewhere 5 to 8.	In west portion, in favourable places advanced growth of sal, 4; bamboo seedlings not uncommon in east portion; reproduction much checked by fires.	Trees to be sold at low rates if any purchasers can be found.
IV. Gwalgarh.	3,435	Bounded on the east by the Sukhrau and the boundary between the open and closed forests, on the north and south by the outer forest boundary and on the west by the Gwalgarh sot. The chief streams flow south and the principal aspects are east and west. The ground is usually precipitous, but towards the south, especially in compartments 2 and 3, moderate and gentle slopes are common.	10° to 40° and over.	...	Sandstone or marl and fairly deep alluvium over most of the marl beds.	Sain is abundant in the north, sál being found only in sheltered nooks, but it mixes in more abundantly towards the south, where it predominates on the moderate slopes and frequently forms pole forest on the alluvium. On the steeper slopes there is an open mixed forest of kokat, such as kat-bhilawa, sain, sandan, bakli, &c., in varying proportions, dhaura being particularly common to the south of Motabara Sot in compartment 2. There are a few chír at the highest points. Bamboos are fairly abundant, and are usually of good quality.	Sál 3 to 6, sain in the north 5 to 8.	In sál forest 6 to 8, in mixed forest 3 to 5.	Usually destroyed by fire, but in the few places spared 5 to 7; advanced growth of kat-bhilawa abundant to the west.	To be fire-protected; selection fellings to be made according to the plan and thinnings where required; climbers to be cut.

V. Malan ...	2,136	Bounded on the east by the Gwalgarh block, on the north and south by the outer forest boundary, and on the west by the Malan nadi. It comprises the eastern half of the basin of the Malan nadi, the general aspects being west, north-west, and south-west. The slopes are precipitous in the north except on village sites, but become less so further south, ending in broad chaors or in gentle slopes along the southern boundary.	20° to 35° and over except on the chaors.	...	Sandstone and marl with alluvium at the base of the slopes in the south.	In the north the forest is not well-stocked, as a rule, owing to the number of village sites, and clearings for fields are still being made; there are a few chír on the highest point. The south is better stocked save on very steep slopes where there is a very open mixed forest. The chaors contain a good mixed forest with a few scattered sál, whilst haldu and sain are common in cool places. Bamboos are found scattered throughout the block and attain a remarkable size just below the main ridge. They are overcut along the foot of the hills.	Sál 5 to 6 ...	On the gentler slopes 6 to 8, on chaors 5, open forest 3.	Usually destroyed by fires, but where spared 6 to 7 katbhilawa seedlings common and sál saplings in places.	Compartment No. 1 to be fire-protected if possible and selection fellings to be made in it according to the plan as well as thinnings where necessary. Climbers to be cut.
VI. Sigadi ...	18,098	Bounded on the east by the Malan nadi, on the south and west by the outer forest boundary, and on the north by the eastern watershed of the Rawasan nadi and the southern boundary of the Laldháng block. It comprises the entire basin of the Sigadi rau within forest limits except a small area included in the Laldhang block. About one quarter of the block consists of flat ground at the base of the hills. The hilly ground is generally precipitous; moderate or gentle slopes are not common.	In the hilly parts varying from 20° to 35° and frequently greater.	...	On the level ground at the base of the hills alluvial deposits of sand or sandy gravel with a large proportion of clay. In the hills sandstone and marl with a narrow deposit of alluvium along the stream, soil often superficial, although frequently of a fair depth; but owing to want of fire-protection it is being washed away from the precipitous slopes.	The flat ground at the base of the hills is very badly stocked with a wretched open forest, composed almost entirely of kokat such as dhák, simal, bahera, rauni, chilla, ber, &c., often interrupted by more or less extensive blanks covered with grass. In the depression on the left bank of the Sigadi rau in the old Papidanda block there are many fine patches of young shisham, khair, saunjna, &c., the growth of khair being especially vigorous. The grazing is extensive. The precipitous hills in the north-east are usually clothed with a poor open mixed forest, sál being found in a few places with gentler slopes and a few chír occurring on the highest points. In the north-west sál and sain are more abundant on the moderate slopes, but are always mixed with numerous kokat. The former is absent where the soil is clayey. Some chír occur on the highest ridges. The lower hills contain generally a mixed sál pole forest on the moderate and gentle slopes and an open mixed forest of inferior species on the more precipitous ground; bakli and dhaura are most abundant in the eastern part of compartment 20. Bamboos of inferior quality occur in scattered clumps on the flat ground.	Sál 3 to 6, sain 4 to 5, shisham 6.	On the flat 3 to 5 and shisham 8. In the hills 3 to 6.	Almost sál on the flat portion, save in one instance where the reproduction of shisham and khair is 6. In the hills seedlings generally destroyed by fire, but where spared the production of sál varies from 4 to 7.	As a rule, only dry timber, fuel, bamboos, and minor produce to be removed, but some thinnings may be made in the sál pole forest in Sigadi 10, 11, 12 and 20. Not even inferior kokat for fuel should be cut in compartments 3, 4, 5, 13, 14 and 15. All dead or fallen shisham or khair should be worked out.

Description of Blocks (Gori Range)—(continued).

Name of block.	Area	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction	Treatment.
						they are more common and of better quality on the hilly ground in hollows and at the bottom of slopes, being most abundant along the foot of the hills where they have been much overcut.				
VII. Lal-dhang	4,278	Bounded on the east and north by the outer forest boundary, on the north-west by the Rawasan nadi, and on the south and west by the Sigadi block. Contains portions of the upper basins of the Sigadi and the Rawasan. Almost every aspect is well represented The ground is nearly always precipitous with narrow ledges between the precipices Slopes more moderate in the eastern part of compartment 1.	Generally over 30.° with ledges in places having an incline of 20° to 30.°		Sandstone and marl the latter most abundant in the north-east of the block.	Very variable Along the northern boundary there is usually a poor open mixed forest of kokat, such as kat-bhilawa. sandan, chír, &c , with numerous sain and bakli mixing in towards the north-west. Further south there is generally a mixed sál forest often containing a notable proportion of sain, bakli and sandan which predominate in exposed situations and in the south part of compartment 3; sál does not occur on the marl. Bamboos, but not of very good quality, are found scattered throughout the block; they are most abundant in the eastern part.	Sál 4 Sain 5. Chír 7.	...	Mixed open forest 3 to 4. Mixed sál 4 to 7.	Usually destroyed by fire but where spared often 6 to 7.	Fellings to be made if any trees can be sold even at low rates.
VIII. Rawasan.	5,933	With the exception of Lal-dháng 5, this block consists of the entire basin of the Rawasan nadi included within forest limits. The greater portion is precipitous and much cut up by the numerous small feeders of the main streams; scarps are not uncommon, but in the lower part of the basin there are many level strips on each bank of the nadi, and compartment 7 consists of an undulating plateau with a large flat adjoining the Rawasan	Usually exceeding 30°, but in compartment 7 the slopes are of 15° only.	...	Sandy with the sandstone frequently exposed or sandy and marly. Alluvium on flats along the lower banks of the nadi.	Very variable. On the steep slopes especially those facing south there is a very open and mixed forest consisting of kokat, such as kat-bhilawa, sain, bakli, sandan, &c., whilst on the sandstone where the slopes are not so steep, there is often a pole forest of sál and sain mixed with numerous kokat: large sál or sain are rare; some chír occur on the highest ridges and tendu is pretty common on the marl. On the flat ground there is little save kokat such as ber, grewia, pula, bauhinia, bel and a few khair. Bamboos are scattered throughout the block and are generally most numerous in depressions; they are abundant at the foot of the hills in compartment 2, and the plateau in	Sál 3 to 5 Sain 4.	...	Open mixed forest 2 to 3, sál forest 5 to 8.	Much checked by fires and sometimes by dense growth of creepers; in places however 5.	Only dry timber, fuel, bamboos, and minor produce to be removed.

						compartment 7 is covered with good bamboos which have, however, been much damaged by elephants, this being a favorite resort of theirs in the rains.					
IX. Luni ...	12,966	Consists of the entire basin of the Luni nadi included within forest limits and the basin of the Mitawali sot below the Amgadi open forest. The north part of the block is precipitous and very inaccessible owing to the precipitous slopes on either side of the various sots; scarps are very numerous in places. In the lower portions the slopes, although frequently precipitous, are often 208 or less as in compartment 11, while below the upper road to Laldháng there is low, level, and occasionally swampy ground, and in two places there are two raised flats of about 225 and 146 acres, respectively, containing good sál. There is also some flat land above the road bordering on the Luni and Mitawali sots.	From above 35° with scarps in the north to 20° and less or flat in the south.	...	On the higher hills soil sandy and superficial with the underlying sand stone rock frequently exposed and metamorphic rocks out-cropping on the highest ridges. On the level ground a sandy alluvium with a good proportion of clay in places and to the south-west. In compartment 11 conglomerate consisting of large boulders and pebbles of all sizes mixed with clay to a great depth, rendering it unfit for good forest growth.	On the higher hills a very poor open mixed forest of small kokat, bakli, sandan, &c., on the southern slopes, whilst on a few of the northern slopes there is a fair proportion of badly grown sál. Lower down on favourable slopes sál becomes more abundant mixed with sain and kokat such as katbhilawa, &c. On the southern slopes is the usual mixed forest with the exception of the raised flat which contains one of the best bits of sál pole forest in the division and of a small sál forest west of the Pandowali sot; the level ground is stocked with a generally open forest of kokat such as ber, bauhinia, pula, chila, bel, grewia, amaultás, sonjna, &c., with some dhaura, khair and haldu, grassy blanks being not unfrequent. There is a considerable quantity of shisham along the Mitawala sot. To the south-west in compartment 11 there is chiefly badly grown kokat with a few wretched patches of sál; scattered dhaura, sandan, &c. Bamboos usually plentiful, especially on the plateau, in compartment 2, but very few and poor in compartment 11.	Sál 2 to 5	...	Sál forest 4 to 6 mixed forest 3, in compartment 11 often only 2.	Would probably be excellent if it were not for fires and excessive grazing around Luni Got, very scanty in compartment 11. As an instance of damage by fire the gentle slope on the west bank of the Daulawala Sot may be quoted where fires have not only on account of the long grass kept down the numberless sál and sain seedlings which are constantly springing up, but have also destroyed many bamboos.	The small sál areas in Luni 5 and 6 might perhaps be protected by burning the low ground early and thus avoiding the expense of fire lines for such small areas, but this should not be attempted if the cost per acre would be excessive. Only dry timber and minor produce to be removed, as well as all dead or fallen shisham and khair.
X. Amgadi ...	3,135	Bounded on the east by the outer forest boundary, on the south by the Luni block, on the west by the Mundal and Dogadda blocks, and on the north by the Dogadda block. Mainly precipitous ground along the upper forest boundary; more moderate slopes in the neighbourhood of the Lohasidh nála and in a few other places.	Precipitous or occasionally 15° to 25° only. Scarps common and landships frequent.	...	Sandy with the sandstone frequently exposed.	Along the upper forest boundary and on southern slopes a poor, open, mixed forest of kokat, bakli and sandan with some sain and gosam; some chír on the highest ridges. Elsewhere on favourable slopes there is a good deal of sál and sain mixed with kokat, sandan and some bakli, the latter predominating in the northern part of compartment 3; sál is abundant in the neighbourhood of the Lohasidh nála, but is rather crooked and stunted. Bamboos are usually numerous.	Sál 3	...	Mixed sál forest 6 open mixed forest 2 to 3.	Of sál good in places.	Trees to be sold at low rates if purchasers can be found.

Description of Blocks (Gori Range)—(continued).

Name of block.	Areas.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
XI. Mundhal	9,259	Bounded on the east by the Amgadi block, on the north by the Dogadda block, on the west by the Ander-Majhera and Jogichaur blocks, and on the south by the outer forest boundary. Contains the greater part of the basin of the Mundhal nadi and the upper and northern basin of the Ghasi Ram ká sot; consists chiefly of low hilly ground often rugged and precipitous and much cut up by numerous small feeders of the Mundal in the compartments facing north on the left bank of the nadi where the water-shed is formed by an almost continuous line of scarps The slopes facing the Ghasi Ram ká sot are much less steep and to the west are only 5° to 15.° Compartment 11 consists of the low flat land on both banks of the Mundal.	Very variable, from very gentle to scarps.	...	In the east varying from a stiff red or yellow clay to a more or less stony loam with sandstone or metamorphic rock sometimes outcropping. South of the Mundal the soil is unfitted for good forest growth, consisting either of large round boulders and pebbles of all sizes mixed with clay to a great depth or of a stiff red clay with scattered pebbles in places. In the western portion north of the nadi there is stiff clay on the ridges and alluvium mixed with pebbles lower down, as well as alluvium along the nadi.	South of the Mundal there is a poor and open mixed forest of small crooked and stunted kokat (such as katbhilawa and sonla), sandan, and bakli with some poor sál and sain. A large number of sál, katbhilawa, &c, have died, probably owing to the bad soil. The forest is particularly poor and open on the slopes facing the Ghasi Ram ká sot. North of the Mundal there is, as a rule, a fair mixed forest of kokat (including numerous dol dhák) with some fairly good bakli and sain as well as sandan and a few gosam and khair. Up the Jhabar Gad there is a considerable quantity of inferior young sál mixed with numerous kokat, especially katbhilawa together with some bakli, sain and sandan. Along the Mundal are some valuable patches of shisham and khair separated by stretches of grass, &c. There are numerous young shisham saplings in places. Bamboos are generally numerous, (being abundant and of good quality in compartment 8,) though they are almost absent on the slopes facing the Ghasi Rám ká sot. They have suffered from over-cutting, from elephants, and from fires.	Sál 1 to 3 ...	As a rule 1 to 5 in compartments 7, 8.	Checked by fires and usually very slight, bakli seedlings being the commonest; in compartment 10, good for kokat and sal.	Selection fellings to be made only in compartment 7 according to the plan. Many small dry trees, sál and others, might be taken out from compartments 3 and 4, but no green trees should be cut unless for fuel, and then only inferior kokat in compartments 7, 9, 10, 11 and 12. All dead or fallen shisham and khair to be sold.
XII. Jogichaur	788	A raised flat near the Ganges traversed by the Gamera sot and by the road from Laldhang to Chila, with some undulating ground towards the east.	On the hilly ground gentle to moderate.	1,000′—1,250′	Excellent; a deep light loam.	A mixed sál forest containing numerous tall, straight, well-grown sál poles and also some old hollow and useless trees. About an equal number of kokat trees are mixed with the sál together with some dhaurá and other species.	Sál 8 ...	2 to 1 ...	Good; young growth nearly everywhere and the blanks under grass promise to fill up after some years of continuous fire protection.	Fire protection to be continued The forest has been very heavily worked in former years and complete rest is required for it. The extraction only of dry wood, bamboos and other minor produce should be permitted.

XIII. Ander-Majhera.	1,410	Bounded on the north by the Dogadda sot, on the east by a fire-line, on the south by the Mundal nadi, and on the west by a fire-line along the base of the hills. A portion with a westerly aspect faces the Ganges whilst a second portion with a northerly aspect drains into the Dogadda sot. The greater part is hilly with usually moderate slopes, but there is a large area of flat ground, bordering on the Ganges and a small plateau in the extreme south-west.	Usually moderate but precipitous in the extreme east and down Lal sot.	...	A stiff clay on the higher ridges, but lower down an alluvial loam with a moderate number of pebbles.	On the hilly ground kokat predominates with a good mixture of sál (chiefly young trees or hollow old ones), sandan and dhaura; on a part of the plateau there is rather a good pole forest of nearly pure sál; on the flat the trees are nearly all kokat (including some fine bel) and dhaura with luxuriant grass. The hills are covered with very numerous first class bamboos, but the clumps seem to have suffered from over cutting and the culms are rather small; creepers abundant in places.	Sál 4 to 6	...5	...	Of sál 5 to 7, kokat 4.	Fire-protection to be continued; selection fellings to be made according to the plan and thinnings where necessary. All climbers to be cut.
XIV. Dogadda.	7,464	Bounded on the north by the Bheng nadi, on the east in part by the outer forest boundary and in part by the Amgadi block. On the south by the Mundal and Ander-Majhera blocks, and on the west by the Ganges. Within this boundary is the separate fire-protected block of Kauria Chaur; contains large areas of level ground, *viz.*, along the bank of the Ganges, the islands in the Ganges, and the rather broad valleys of the Bheng nadi and the Dogadda sot. The rest is hilly ground, with usually moderate slopes.	Usually moderate but frequently over 30° on the left bank of the Dogadda and Suni sots.	...	Alluvial on the chaors and islands and in the valleys; elsewhere a stiff red clay on ridges giving place to a stony loam below; good light loam with boulders on Dudli Maidan.	On the chaors there is chiefly grass; sometimes also very scattered kokat such as dhák, ber, rauni, semal, &c. On the islands and in the valleys of the Bheng and Dogadda there are many patches of shisham and a little khair separated by stretches of grass with a few kokat. There are numerous young shisham and khair saplings, and sonjna is common mixed with shisham along the Bheng nadi. All shisham and khair trees have been counted. In the hilly ground there is usually a mixed forest of kokat, sain, sandan, and bakli, with few sál and a good proportion of dhaura on the clay; on south slopes there is a poor open mixed forest containing such kokat as kat-bhilawa, ber sterculia, &c., and some sandan and bakli; on the Dudli Maidan there is good sál.	Sál 3. On Dudli Maidan 8.	0 to 8	...	Very variable ...	The sál forest of the Dudli Maidan should be protected by a continuation of the Kauria chaor fire-line and perhaps a little thinning might be done in places. Only dry wood, fuel, bamboos and minor produce to be taken out as a rule, and no green trees should be cut in compartments 1, 4, 5, 6 and 7.
XV. Kauria-chaur.	2,118	A plateau cut into along its edges by deep ravines traversed by the Thatera sot and situated close to the Ganges between the Bheng nadi and the Dogadda Sot.	...	...	A fairly good loam, frequently mixed with pebbles.	In the north there are numerous large open spaces covered with coarse grass and scattered kokat interrupted by patches of dense under growth of the muror-phali *(Helicteres isora)*, sometimes dominated by rauni and young dhaura or sál or scattered kokat. In the south there are numerous fairly-well grown young sál poles with a few old hollow and crooked trees mixed with dhaura and kokat,	...	From 1 in the open spaces to 6 in the mixed sál forest.	In the north checked by grass and bushes. In the sál forest 8 for sal.	Fire-protection to be continued. In compartment 2 improvement fellings might be made by extracting old unsound sál where the advanced growth would benefit by the operation; climbers to be cut and under-

Description of Blocks (Gori Range) – (concluded).

Name of block.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
						whilst small inferior bamboos are tolerably abundant; creepers are common in ravines.				growth to be cleared away where it interferes with the reproduction of sál and other valuable species.
XVI. Bedasni.	6,304	Bounded on the north by the Ganges, on the east by the outer forest boundary, on the west and south by the Kunau block. The principal aspects in the northern portion which faces the Ganges are north and west, whilst the southern half has an easterly aspect and drains into the Bedasni nadi; very rocky and precipitous hills in the north, somewhat less precipitous and forests more easily worked on the Bedasni side.	Frequently 35° and above, not often less than 30.°	...	Superficial, shall or with underlying metamorphic rock in places, some outcropping limestone on the highest points.	Towards the top of the ridge in the north there is a very poor scrubby kokat jungle of bauhinias (including semla) *Engelhardtia, Phyllanthus*, &c., very few sain and a few ban oak on the highest points; no bamboos. The lower portions contain kokat, numerous bakli, sandan and sain, some gosam and khair; inferior bamboos are numerous. In the east of compartment 2 there is a wretched forest of inferior kokat, such as rhus, rauni with some bakli; gosam is common in places. Bamboos are pretty common but the clumps are small and the culms of small girth. Compartments 3 and 4 are so inaccessible that they were not valued. Facing the Bedasni there is a fairly good bakli and sandan forest with kokat such as bauhinia, pula, &c., and a few haldu and sain. Where there is clay dhaura is common. The bakli is often hollow, in fact recent fellings show that 50 per cent. of the trees are bad; sál is almost entirely absent.	Dhaura 3 to 6,	4 on the higher ridges to 8 in the south part of the block.	Generally 1 only, but sometimes 5.	Selection fellings to be made according to the plan.
XVII. Kunau.	7,972	Bounded on the north and west by the Ganges, on the east by the Bedasni block, and on the south by the Bheng nadi. The whole with the exception of compartment 1, which forms a part of the basin of	Usually gentle or moderate but precipitous bordering on the Bedasni block.	...	Loamy with a large percentage of clay, the underlying rock being shale or metamorphic rock; a red or yellow clay in places; alluvium on the pla-	Variable. In the low hills usually a mixed forest of kokat, bakli and sandan with occasionally a large number of gosam and generally a few sain. The kokat are usually ber, chila, rauni, bauhinias, ehretia, bahera, dhudi, &c.; dhaura is common on the clay. There is ra-	Bakli 3 to 6, Gosam 4.	Varying from 1 to 9, very open on the chaors.	Generally almost *sil*, which is probably due to excessive grazing and to fires; better in compartments 1 and 2.	To be fire-protected; no green timber to be cut on the chaors; and elsewhere only inferior kokat for fuel, if required, except in Kunau 1, where

	the Bedasni, faces the Ganges, the main aspect being west. The largest and south part of the block consists mainly of low hills with very intricate topography, the ground being intersected by innumerable small streams, rocky and precipitous along the upper boundary. Compartment 2 is a plateau. The north is chiefly composed of a number of chaors sloping very gently towards the Ganges, but there is again hilly ground in the north of compartment 7.			teau. Hard sandstone out-cropping along the upper boundary.	ther a good mixed forest of kokat, bakli and gosam up the Lal sot, and compartment 2 is almost solely stocked with kokat on the chaors; there is very poor forest of kokat such as ber, dhaura, amaltás, chila, bel, ehretia, bauhinia, &c, with some poor bakli, dhaura and sandan and a very few wretched sál here and there. There is some good bakli and gosam in compartment 7 along its upper boundary; bamboos are abundant nearly everywhere, but they appear to have been overcut and both the clumps and the individual culms are very small, especially on the chaors.				selection fellings should be made in accordance with the plan. All climbers might be cut.

DESCRIPTION OF COMPARTMENTS (GORI RANGE).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
Kunau 1 ...	886	Hilly ground, bounded on the east by the Bedasni block, on the south by the Bedasni nadi, and on the west and north by Kunau 3; comprises the basin of the Lál sot and of several small tributaries of the Bedasni. General aspect south.	Moderate, but frequently over 30° in the higher parts.	...	Loamy from decomposed metamorphic rock, large fragments of which are scattered about.	In the Lál sot there is rather a good bakli forest mixed with kokat, such as amaltás, dhol-dák, ber, &c; dhaura, sandan and gosam are also common, and there are some inferior bamboos. On the part facing the Bheng nadi there is a much poorer forest of bakli mixed here and there with young khair.	Bakli 6 to 3 ...	6 in Lál sot, 4 elsewhere.	5 ...	To be fire-protected; selection fellings to be made according to the plan.
„ 2 ...	374	A plateau bounded on the east by the road from Gori ghát to Bedasni, on the north-east by the Baksa sot, on the north by the outer forest boundary, and on the south-west by the Bheng nadi.	...	...	Alluvial ...	A kokat forest consisting of rauni, babera, ber, chila, dhudi, &c., with a few sain, bakli and dhaura. The ground is well covered with under-shrubs such as bashang; bamboos of somewhat inferior quality are common.	3 ...	4 to 9 ...	Good, especially of rauni.	To be fire-protected, no green timber to be cut, except inferior kokat for fuel.
„ 3 ...	1,277	Very intricate, the compartment being cut up by innumerable small streams. The whole faces the Ganges and is included between the Haldu sot, a ridge rising from it to the north and a ridge just to the north of pillar No. 3, running down to the Bheng nadi. Chief aspects west and north-west.	Generally moderate, but more precipitous along the upper boundary.	...	Loamy with underlying shale or metamorphic rock. Hard sandstone outcropping along the upper boundary.	Variable, but usually kokat, bakli, sandan and some sain. Patches of sál here and there, but few large trees; associated with bhilawa and kat-bhilawa some poor crooked sál near the upper boundary. In places towards the south-east a forest of young kokat such as rauni, amaltás, ehretia, with some bakli, dhaura, &c., and young sál in places; inferior bamboos abundant everywhere.	Dhaura 4 ...	5 to 8 ...	4 in the east 1 in the west.	To be fire-protected, no green timber to be cut, except inferior kokat for fuel.
„ 4 ...	1,440	Very intricate, the compartment being cut up by innumerable small streams. The whole faces the Ganges and is included between the Phalinda and Haldu sots in the south and between ridges rising from these sots in the north. The general aspect is west.	10° to 20° in lower part, precipitous and often over 35° towards the upper boundary.	...	As in K. 3 ...	Variable, but mainly kokat such as rauni, bauhinias, amaltás, ehretia, ber, &c., with some sandan, dhaura, bakli, gosam, sain and a very few haldu. The bakli is most abundant and of finest quality towards the upper boundary where sál occurs in places, but it is generally crooked and frequently hollow, attaining a height of 60′ to 70′; goj creepers common; grass abundant.	Dhaura 3 to 4, sál 3.	1 to 7 ...	Almost *nil*, except of the goj creeper and of rauni in a few places.	To be fire-protected, no green timber to be cut, except inferior kokat for fuel. The climbers might be cut.

„ 5 ...	1,485	Very intricate, the ground being cut up by innumerable small streams. The whole faces the Ganges and is included between the Phalinda sot and the Ghát khola and ridges rising from them to the north. The general aspect is west.	5° to 25,° but precipitous towards the north.	...	A stiffish loam or a red or yellow clay.	A very abundant crop of fairly good bamboos with bakli, sandan, gosam and kokat with a few sain. On the clay dhaura is common mixed with kokat such as ber, chila, amaltás, ehretia, &c.; only a few sál and haldu in places. At the foot of the upper part of the compartment there is rather a good bakli forest in places. Grass abundant where bamboos are absent.	Bakli 4 to 6, gosam 4, bakli 1.	1 to 5 ...	Almost *nil*, which is probably due to excessive grazing.	No green timber to be taken out except inferior kokat for fuel.
„ 6 ...	1,060	The compartment lies between the Ghát khola to the south and the Maliwala sot to the north, whilst on the east it is bounded by the Bedasni block and on the west by the Kunau village land. It consists chiefly of chaors with very gentle slopes and west aspect.	Very gentle ...	...	Ditto ...	A very poor forest of kokat such as ber, amaltás, chila, bel, ehretia, &c., with very few sál and some poor bakli, dhaura and sandan. Inferior bamboos abundant towards the northern boundary.	Bakli 1 ...	1 to 4 ...	0 to 1. This unsatisfactory state is due probably both to bad soil and excessive grazing.	No green timber to be taken out from the chaors and elsewhere, only inferior kokat for fuel.
„ 7 ...	1,694	Bounded on the north and east by the Bedasni block, on the south by the Maliwala sot and on the west by the Ganges. The largest and southerly portion consists of a number of chaors sloping very gently towards the Ganges, whilst farther north there is hilly ground rather cut up by numerous small sots. The Jam Khani ká chaor and adjoining islands, covering an area of 243 acres, are included in this compartment.	Very gentle on the chaors, usually moderate in the hills.	...	Stiff loam with shaly rock or clay.	On the chaors bamboos are very abundant, but they appear to have been overcut and both the clumps and the individual culms are very small; mixed with the bamboos is a scattered forest of kokat, such as ber, rauni, bauhinia, bakli, amaltás, bel, chila, &c., with some dhaura, and sandan; in places a few haldu and khair and some wretched sál. In places along the upper boundary good bakli is found with numerous bamboos. Grass abundant.	Bakli 1 to 2; but near upper boundary 7.	3 to 4 ...	Indifferent: probably due to excessive grazing.	Ditto.
Kauria chaur 1	1,172	A plateau cut into along its edges by deep ravines.	...	...	A fairly good loam mixed here and there with pebbles.	Numerous large open flats covered with coarse grass and scattered kokat interrupted by patches of dense undergrowth of the murorphali (*Helicteres Isora*) some times mixed with rauni and young bakli or sál and with scattered kokat above.	...	1 in the open flats and 3 for the trees dominating the undergrowth of *Helicteres Isora*, &c.	A few sál seedlings here and there, but reproduction checked by grass and bushes.	Fire-protection to be continued; climbers to be cut and undergrowth cleared away where it interferes with the reproduction of sál or other valuable species.
„ 2 ...	946	A plateau traversed by the Thatera sot, steep banks along the sot, and along the	...	...	A good loam frequently mixed with pebbles.	Fairly well grown young sál poles with a few old hollow and crooked trees mixed with dhaura and kokat.	Young sál 6 ...	7 and 6 ...	Of sál 8 ...	Fire protection to be continued; improvement fellings

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slopes.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
		edges of the plateau covering about 306 acres.				Small inferior bamboos tolerably abundant; creepers common in ravines.				might be made by extracting old sál where advanced growth will benefit by the operation. The poles might be thinned out in places.
Bedasni 1 ...	961	Steep hilly ground with easterly aspect facing the Bedasni nadi.	20° to 35° and over.	...	From shaly to loamy with a little clay in places.	A fairly good bakli and sandan forest with kokat such as bauhinia, pula, &c., and a few haldu and sain where there is clay; young dhaura predominates. The bakli is frequently hollow, in fact, recent fellings show that 50 per cent. of the trees are unsound; bamboos are common, but the clumps are small and the culms of inferior size. Goj climber abundant.	Bakli 5 ...	6 ...	Of sandan, kokat and goj 7, of bakli 3, grass abundant.	To be fire-protected if possible; selection fellings to be made according to the plan; climbers to be cut.
„ 2 ...	627	Ditto ...	Ditto ...	...	Ditto ..	To the east a wretched forest of inferior kokat scrub, such as rhus, rauni, &c., with some bakli; elsewhere a better forest with numerous dhaura (frequently hollow) with some sandan, gosam and kokat, a few patches of inferior sál.	Sál 3, dhaura 5,	8 ...	Of sál where it occurs, good; of other species, indifferent.	To be fire-protected if possible; selection fellings to be made according to the plan.
„ 3 ...	1,143, chak 13	Very rocky and precipitous ground facing the Ganges being the upper basin of the Maliwala sot.	35° and often above.	...	Soil superficial, rock metamorphic.	Wretched kokat and bakli, &c., not considered worth valuing, some good dhaura, however, bordering on Kunau 6.	...	...	...	Nothing can be done.
„ 4 ...	766, chak 78	The upper basin of the Jamkhara ká sot facing the Ganges and very rocky and precipitous.	Ditto ...	...	Ditto ...	Ditto ditto	...	...	...	Ditto.
„ ...	1,417 and chak 25	Hilly and precipitous ground containing the basins of numerous small sots running into the Ganges. General aspect north-west.	...	...	Superficial, shaly; underlying rock metamorphic.	On the hilly ground a very poor forest, bakli being the most important species accompanied by sandan, a few gosam and numerous kokat. The flat is stocked with kokat such as ber, rauni, chila, &c., with some gasam and a very few haldu. Bamboos common in places only.	Bakli 3 ...	4 in the hilly ground, 7 on the flat.	1 ...	Selection fellings to be made according to the plan. Climbers to be cut. To be fire-protected if possible.

„ 6 ...	1,390 and chak 693.	Very rocky and precipitous, ground containing the basins of numerous small sots running direct into the Ganges, the principal being the Khairari sot. General aspect north.	30° and often above.	...	Superficial, shaly; underlying rock metamorphic.	In the upper part a very poor scrubby kokat jungle of bauhinias (including semla), *Engelhardtia*, *Phyllanthus*, &c. Very few sain and a few ban oak on the highest points; no bamboos. The lower portion contains bakli, sandan and sain, some gosam and khair and numerous kokat; inferior bamboos are numerous, as also are creepers.	Bakli and sain 3 to 4.	4 in upper part, 5 to 6 in lower	1 above, 5 below.	Ditto.
Ander Majhera 1.	768	The whole faces the Ganges lying between the Mandal nadi and the watershed of the Lal sot The upper portion is hilly ending in a plateau to the south-west, whilst close to the Ganges there is a large area of flat ground.	...	1,000′—1,400′	Alluvial, with a moderate number of pebbles.	The hilly ground is covered with very numerous first class bamboos, but the clumps seem to have suffered from overcutting in past years, and the culms are rather small; mixed with the bamboos are kokat, sál (chiefly young trees or hollow old ones) sandan and dhaura. On a part of the plateau there is rather a good forest of nearly pure young sál. On the flat the trees are nearly all kokat (including some fine bel) and dhaura, with much grass.	Sál 6 ...	5 ...	Of sál 8, of kokat 4.	Fire-protection to be continued. Selection fellings to be made according to the plan, and thinnings where necessary. Climbers to be cut.
„ 2 ...	642	Nearly the whole faces north and drains into the Dogadda sot, except the basin of the Lál sot, a small stream running direct into the Ganges.	Moderate or gentle, but precipitous in the east part and down the Lál sot.	1,090′—1,612′	A stiff clay on the higher ridges, with alluvial lower down.	Bamboos plentiful, amongst the trees kokat predominates with a good mixture of sál, dhaura and sandan; creepers common in places.	4 ..	5 ..	6 ..	Ditto.
Dogadda 1 ...	802	Contains all the forests not open to rights in the upper basin of the Dogadda sot known here as the Dhaura sot. General aspect north but 100 acres north, of sot with south aspect.	Moderate ...	...	Good on north slopes, superficial on parts facing south.	A mixed forest of kokat, sál and sain on the slopes facing north, and on southerly aspects a forest of bakli, kokat, sain and gosam.	Sál 5, sain 5 ...	3 to 6 ...	...	Standing trees may be sold if purchasers can be found.
„ 2 ...	1,020	Includes the basin of a large tributary of the Dogadda sot, running in a west direction, and some precipitous ground in the west directly draining into the Dogadda Main aspects west and north-west.	On Dudli Maidan 5° to 10,° elsewhere frequently over 35.°	...	On Dudli Maidan light loam with large boulders. To the west stiff clay on the higher ridges and alluvium near the Dogadda sot.	On the Dudli Maidan and its immediate neighbourhood sál is plentiful, there being some moderate-sized fairly-straight trees and a large number of well-grown healthy-looking saplings with numerous seedlings. In the remainder of the compartment there is the ordinary mixed forest containing chiefly kokat. Bamboos are good and numerous	Sál 8 .	5 to 8 ...	Of sál 6, kokat 3.	The sál forest to be fire-protected and perhaps a thinning made in places.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration	Slope.	Altitude.	Soil.	Stock	Quality.	Density.	Reproduction	Treatment.
Dogadda 3 .	874	Includes the entire basin of the Suni sot, except the lower and fire-protected portion.	Moderate, from 5° to 25° north of the sot; more precipitous and frequently over 30° to the south.	1,090′—1720′	As a rule poor, but varying from a stiff red clay on the ridges to loam mixed with pebbles lower down.	North of the sot there is a poor open mixed forest of kokat, such as katbhilawa, ber, sterculia, &c. A little bakli is found nearly everywhere with some sál and khair in places whilst sandan is fairly common. The trees are small and badly grown. South of the sot sál and dhaura are more abundant and creepers are numerous; bamboos are fairly abundant. Some shisham occur along the sot.	3 ...	4 ..	3 ...	Dry wood, fuel, bamboos and minor produce to be taken out.
„ 4 ...	894	Occupies the left bank of the Bheng nadi from the forest boundary to the road from Dogadda sot. General aspect northerly.	Moderate .	...	A superficial stony light loam, the stones coming from the underlying hard metamorphic rock.	A mixed forest of scattered kokat and bakli, sandan, and some gosam, dhaura, sam and haldu, with a few sál in places Numerous good bamboos. Goj creepers abundant.	5 ...	5	6 .	Ditto.
„ 5 ...	1,232	Comprises the low flat land on both banks of the Dogadda sot from where the road crosses the sot to the Ganges and the islands in the Ganges facing Jamnia Bagh.	...	...	Alluvial ...	Patches of shisham and a little khair interrupted by stretches of grass, &c, with a few kokat There are numerous young shisham saplings in places; kokat generally predominates in the Buriwala Majhera.	Shisham 7 ..	Very variable ...	...	Buriwala Majhera to be fire protected. Only dead or fallen shisham and khair to be extracted and no green kokat cut for fuel, except where it impedes the growth of more valuable species.
„ 6 ...	1,184	Comprises the low flat land on both banks of the Bheng nadi from Sonjna paráo to the Ganges and the islands in the Ganges lying near the mouth of the Bheng nadi.	...	...	...	As in Dogadda 5 but saonjna trees numerous in places and less kokat in the islands.	...	Ditto ...	...	Only dead or fallen shisham and khair to be extracted and no green kokat except to encourage growth of shisham and khair.
„ 7 ...	963	Includes the Ganga Ram and Tunt chaors, bounded by the Bheng nadi on the north-east, by the Kauria chaor fire-line on the south and east and by the Gohri Ghát road on the west; land flat and occasionally marshy	...	...	Alluvial ..	Chiefly grass with sometimes very scattered kokat, such as dhák, ber. rauni, semal, &c	...	0—3 ...	Almost *nil* .	A few semal may have to be cut, but otherwise the compartment should remain untouched

Amgadi 1 ...	1,586	Contains the basin of many tributaries of the Mitawali sot, all flowing in a south direction, the two largest being the Lohasidh-ká-nála and the Guari sot. Ground pretty even between these two tributaries, but rocky and precipitous to the east and west of them.	15° to 25° between Lohásidh nála and the Guari sot; to the east precipitous, landslips being common; slopes over 30° west of the Lohasidh nála.	...	Sandy, with the sandstone frequently exposed.	Sál abundant in the Sot between the Lohasidh nála and the Guari Sot, but rather crooked and stunted, varying from 40′ to 60′ in height; sain common in places, whilst kokat, dhaura and sandan predominate in the east portion where the forest is very open and poor with some chír on the highest ridges. Inferior bamboos numerous to the west.	3 ..	Mixed sál forest 6 east part 2 to 3.	Fairly good ...	Selection fellings to be made if the trees can be sold.
„ 2 ...	1,156	Consists of the upper basin of the Amgadi rau, which runs in a west direction: the main aspects are north and south.	Variable often precipitous, especially to the south-east.	...	...	A good deal of sál and sain, mixed with kokat, sandan and some bakli, over the greater part of the compartment; but in the south-east corner chiefly kokat. Bamboos and creepers abundant in the east portion.	Sál 5, sain 5 ...	4 to 6 .	Of sál, good in places.	Ditto.
„ 3 ...	393	Contains the basin of numerous small streams running into the Dogada sot from the north and in the upper part of some similar streams on the opposite bank. The main aspects are north and south.	Moderate to precipitous.	...	...	Sál abundant on the cooler slopes mixed with kokat, sandan and sain, but on slopes with a south aspect the stock is mainly bakli, kokat and sandan, with some gosam and sain.	Sál 5, sain 5 ..	3 to 8 ...	Of sál good ...	Ditto.
Mandal 1 .	990	Comprises the basin of several tributaries on the left bank of the Mandal nadi from the boundary of the open forest to the Laldháng-Ander-Majhera road.	Usually 15° to 20.°	...	Marly and sandy ...	A rather open mixed forest of kokat (amaltás common), bakli and sandan, with some sál on favourable slopes, and some good shisham on the banks of the Mandal. Numerous bamboos; clumps of variable quality having suffered from fires, from over-cutting, and from elephants.	Sál 3 ..	4 ...	Slight 2 ..	No green timber to be taken out.
„ 2 ...	653	Low hilly ground, much cut up by numerous small streams, running north-west into the Mandal. The south boundary forms an almost continuous line of scraps, showing the great depth of the conglomerate.	Often steep and scarps common.	...	As in Luni 11 ...	Chiefly kokat, bakli and sandan, forming a poor open mixed forest. Inferior bamboos are fairly common, filling up blanks between the trees, and creepers are common in the ravines.	2 ...	2 to 4 ..	...	Ditto.
„ 3 ...	950	Low hilly ground, much cut up by innumerable small streams, chiefly feeders of the Beriwala and Dhaurawali sots, but some running directly into the Ghasiram-	Gentle slopes common near the Beriwali sot.	...	Ditto ...	A poor open mixed forest of scattered, crooked and stunted kokat and bakli, with some sál and sain from 30′ to 50′ high A large number of young sál, kat-bhilawa, &c., have died, probably owing to the	1 ...	1 to 4 ...	Checked by fires. Some bakli seedlings still remain.	No green timber to be cut, but the dry trees might be extracted.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction	Treatment.
		ká-Sot. The main aspect is south-west, with minor south-east and north-west ones.				poverty of the soil. The best part of the forest is near the Beriwala sot. There are scarcely any bamboos.				
Mandal 4 ...	1,197	Contains some slopes draining into the Ghasiram-ká-sot and the upper basin of the Gamera sot. General aspects as in Mandal 3.	Gentle, varying from 5° to 15°.	1,100′-1,625′	A stiff red clay, with scattered pebbles in places.	A very poor and very open forest of stunted, badly grown kokat (such as kat-bhilawa, ber and aonla), sál, sandan, and bakli, the ground being immediately covered by long Bhábar grass. There are many dead sal and kat-bhilawa as in Mandal 3 There are no bamboos.	1 ...	1 on ridge to 6 in ravines.	Very slight save of bakli.	Complete rest necessary. Nothing should be cut here except dry trees.
„ 5 ...	445	Low hilly ground, much cut up by innumerable small feeders of the Mandal nadi. The general aspect is north-east.	Precipitous, scarps being common.	1,165′-1,625′	A stiff red clay above and a sandy loam, mixed with large pebbles below.	Somewhat better than in Mandal 4, consisting of inferior kokat, sandan, sál and some bakli. Inferior bamboos are fairly numerous.	3 ...	4 ...	Some seedlings of sál, bakli and kokat.	Troublesome to work No green trees to be cut.
„ 6 ...	1,022	Low hilly ground north-east of the Laldháng Ander-Majhera road and between the Mandal nadi and the Seoudiari-ki-sot.	Gentle or moderate.	...	Vary from a stiff red or yellow clay to a stony loam.	The parts facing south contain a wretchedly poor and very open forest of small bakli and kokat (such as ber and thunera), whilst the cooler slopes also contain chiefly kokat (doldhák being conspicuous) with some tolerably fair bakli and sain. Small clumps of second-rate bamboos are found on the more favourable slopes.	2 ...	Average 2 ...	On south aspects *sal*; elsewhere 4.	No green trees to be cut.
„ 7 ...	910	Comprises the basins of the Khaipani-ká-sot and of the Maindarghati-ki-rau, both running south-west into the Seondari-ki-sot and of a few short slopes running directly down to the latter. Low hilly ground, rather cut up by the numerous tributaries of the above mentioned streams.	Very gentle to the east; precipitous with scarps to the west.	...	Loamy with rock appearing here and there. The rock is metamorphic in the east, sandstone in the west.	A good mixed forest of kokat, with occasional bakli and sain in the east portion, and here and there a few acres of sál. To the west of the Maindar-ghati-ki-rau there is a fair mixed forest of kokat and bakli. Bamboos are fairly numerous throughout.	Bakli 6, Sain 5,	8 ...	4 ...	Selection fellings to be made according to the plan, and thinnings where required. Climbers to be cut where found.
„ 8 ...	650	Comprises the basins of the Mulhiawála, Dumarawála	Variable, but often precipi-	1,161	Good as a rule, varying from a yellow-	A mixed forest of kokat, with some good bakli and some khair, as well	Bakli 6 ...	3 ...	Of kokat 7 in the east	No green trees to be cut.

		and Kolhuwála sots, and consists of low rugged hills, the ground being much cut up by the numerous small feeders of the above sots. General aspect south-west	tous.		ish clay to a good loam here and there, with pebbles intermixed.	as few sain, gosam and sandhan, but with scarcely any sál. Bamboos very abundant and good.			part of khair 2.	
„ 9 ...	678	Includes the upper basin of the Jhabargadh and all the slopes on the south bank. The main aspects are north and south-west.	Ditto ..	1,100′-1,560′	On the ridges a stiff clay, lower down to the north of the Gad alluvium mixed with pebbles.	A poor mixed sál forest, kokat predominating mixed with sál, some bakli, sain and sandan. Bamboos good, but scattered, and only numerous on the level ground bordering on Mandal 8.	Sál 2 ...	4 ...	Indifferent ...	Only dry wood, bamboos and minor produce to be worked out.
„ 10 ...	788	Contains the lower west part of the basin of the Jhabargad and the east half of the basin of the Pattharwála sot. General aspect south.	Gentle, not often exceeding 10.°	1,100′-1,720′	Ditto ...	A young mixed forest, with a fair proportion of sál. Kokat, however, predominates, especially kat-bhilawa, whilst there is a fair quantity of sandan, bakli and dhaura.	Sál 3 ...	4 ...	Of kokat and sál good.	Ditto.
„ 11 ...	716	Contains the low flat land on both banks of the Mandal nadi, from the Mandal paráo to the mouth of the stream.	...	1,000′-1,197′	Alluvial ...	Patches of shisham, with a few khair, interrupted by stretches of grass, &c. There are numerous young shisham saplings in places.	...	...	Very few seedlings.	Only dead or fallen shisham and khair or kokat to be sold.
Jogichaur...	788	Forms a separate block; for details *vide* "description of blocks."	...	...	...	...	...	...	...	...
Luni 1 ...	888	The upper basin of the Pandawali sot, bordered on both sides by precipitous slopes, rendering the compartment very inaccessible. Main aspects west and east.	Frequently over 30°; and often precipitous, but some gentler slopes above.	...	Sandy, with the underlying sandstone constantly exposed.	On the more moderate slopes sál forms about half of the stock, sál saplings being common and mixed with kokat, such as kat-bhilawa, &c., as well as with sain; elsewhere the usual mixed forest. Good bamboos are numerous in places only.	Sál 4 to 5 ...	Average 6 ..	Of sál and sain 8.	Dry wood, bamboos, and minor produce to be removed and standing trees if they can be sold.
„ 2 ...	757	The lower basin of the above sot as far as the upper road. The higher east portion forms part of an undulating plateau.	Steep near the sot, with gentler slopes above.	...	Ditto ...	A fair amount of sál on favorable slopes, especially on the eastern bank of the Pandawali sot; on other slopes kokat, such as kat-bhilawa, abound, mixed with sandan, bakli, &c. Bamboos few and inferior save on the plateau and its neighbourhood, where they form a large portion of the stock.	Sál 4 to 5 ..	Ditto ..	Sál 6 ...	Fuel, dry wood, bamboos and minor produce to be removed.
„ 3 ...	1,370	Includes the basin of the Nani Dhar sot and some slopes in the north draining directly into the Luni nadi. The sides of the Nani Dhar sot are precipitous, rendering	Precipitous, with numerous scarps on south faces.	...	Ditto ...	Very poor, as a rule, and consisting of an open mixed forest of small kokat, bakli, sandan, &c., on the south slopes, whilst on a few of the north slopes there is a fair proportion of badly grown sál poles,	Sál 3 ...	Sál forest 6, mixed forest facing south 3.	1 for sál, sain and kat-bhilawa.	Fuel, dry wood, bamboos and minor produce to be removed and standing trees if they can be sold.

Description of Compartments (Udepur Range)—(continued).

Number of compartment	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
		the compartment very inaccessible.				from 20′ to 40′ high. Bamboos are most numerous in the north portion, but are of inferior quality. They are better but few in number towards the source of the Nani Dhar sot. Creepers are common.				
Luni 4 ...	1,20[illegible]	The slopes drain into the Luni nadi and have a west aspect, except some in the south, which drain into the Pandawala sot and face south-west The road up the Luni nadi is fit for camels as far as the Sasai paráo.	Generally steep, but in the south-east less so, varying from 15° to 30.°	...	Sand or loam with metamorphic rocks on the higher ridges.	A mixed sál forest in the upper portion. but mainly kokat along the nadi, and a mixed forest of kokat and bakli on the portion facing south-west, immediately above the Laldháng Mandal road. The bamboos are good and numerous on the upper undulating portion.	Sál 5 ...	4 ...	Seedlings of kokat and sál 4.	Only dry wood, bamboos and minor produce should be taken out, and all dead or fallen shisham and khair should be utilized.
„ 5 ...	1,692	Low level ground between the Luni nadi and the two roads from Laldháng. Ground swampy to the west of and bordering on the Pandawali sot. Between this swampy ground and the Laldháng Mandal road there is a raised flat of 146 acres.	...	...	Sandy alluvium, with a good proportion of clay in places.	Principally kokat, such as ber, bauhinia, pula, chilla, bel, grewia, amaltás, sonjna, with some dhaura, khair and haldu. There is some fairly good young sál west of the Pandawala sot and near the Laldháng-Ander-Majhera road grassy blanks are not unfrequent. Bamboos are plentiful and fairly good in places. On the raised flat is a sál forest similar to that found in the adjoining compartment.	Sál 5 ..	0 to 8 .	Kokat forest 1 Sál forest 5.	Complete rest is necessary, no green timber must be taken out. All dead or fallen shisham and khair should be utilized.
6 ..	1,258	Contained between the Luni nadi, the Mitawali sot and the upper and lower road from Laldháng The ground is flat and swampy in parts It is intersected by the Sirkra sot, between which and the Luni nadi is a raised flat of about 225 acres.	...	...	Ditto ...	On the raised flat there is a good sál forest consisting of rather well grown young poles from 60′ to 100′ high, which has been completely valued. The rest of the compartment is stocked with a very open forest of khair and kokat, the grass being most luxuriant. Along the Mitawali sot there is a considerable quantity of shisham.	Sál 7 ..	Kokat forest 1 to 3, sál forest 8.	In sál forest chiefly Goj, but sál seedlings are fairly numerous and saplings common.	The sál forest might perhaps be protected by burning the low ground early in the season, so as to avoid the expense of a fire line for such a small area. No green timber must be cut; but dead or fallen shisham and khair should be worked out.

„ 7 ...	439	Over one-third of the area is a flat bordering the Luni nadi; the remainder is on moderately steep slopes, facing south and draining into the nadi.	15° to 35° ...	...	Ditto ...	Almost entirely kokat, especially on the flat, consisting of the species enumerated under Luni 5, and occasionally of nothing but young growth. Inferior bamboos and creepers are numerous.	...	4 to 8 ...	Indifferent, owing to excessive grazing.	Only dry wood, bamboos and minor produce should be taken out, and also dead or fallen shisham and khair.
„ 8 ...	1,910	Occupies the basins of numerous streams running south-east or south-west into the Luni nadi, the largest being the Daulawala sot. Landslips are apparently common.	Very precipitous and numerous scarps, but up the Daulawala sot there is a slope in one place of 10° to 15° only.	...	Sandy and loamy, the sandstone rock being constantly exposed.	Generally a poor open mixed forest of kokat, sandan and bakli. The gentle slope up the Daulawala sot is stocked with a considerable quantity of good bamboos and a scattered forest of sal, sain and kokat.	Sál 3 ...	Open mixed forest 3, sál forest 5.	On the gentle slope there are numberless sál and sain seedlings, but fires in the long grass have kept them down, and also destroyed many bamboos.	Most of the compartment north-east of the Daulawala sot is too precipitous to work. All saleable produce may be worked out.
„ 9 ...	1,167	Includes the upper basin of the Sirkra sot to the Laldhang-Ander-Majhera road.	Variable ...	...	...	As a rule, mixed forest with a quantity of bakli on southern slopes. A mixed sál forest on the slopes facing the north-east. Bamboos tolerably abundant on the cooler slopes.	Sál 4 ...	Open mixed forest 3, sál forest 5.	Sál and kokat 4.	Only dry wood; bamboos and minor produce to be taken out.
„ 10 ...	862	Consists of the upper basin of the Pulawala sot as far as the Laldhang-Mandal road, and of slopes to the north-east running directly down to the Mitawali sot. There is some low level ground close to the road.	Moderate on both sides of the Pulawala sot, steeper towards the Mitawali sot, but seldom over 30.°	...	Sandy and marly ...	The lower part of the Pulawala sot contains chiefly kokat, whilst in the upper part there is rather an inferior forest of kokat, sál, bakli and sain. The portion facing the Mitawali sot contains mostly kokat and bakli. Inferior bamboos are numerous.	Sál and sain 4...	Average 6 ...	Abundant for all kinds.	Ditto.
„ 11 ...	1,710	Contains the basin of numerous small tributaries running south-east into the Mitawali sot, and of the east half of the basin of the Khára sot as far as the Laldháng-Khára road. There are some flats bordering the Mitawali sot.	Fairly gentle as a rule, varying from 10° to 20.°	..	Coarse conglomerate of large round boulders and pebbles of all sizes, mixed with clay to a great depth; unfitted for good forest growth.	Chiefly kokat of inferior growth with a few wretched patches of sál; scattered bakli and sandan with kokat are found on the south slopes. There is some young shisham here and there near the Mitawali sot. Bamboos few and of poor quality.	2 ...	2 to 3 ...	Scanty 1 ...	Only dry wood, bamboos and minor produce to be taken out and all dead or fallen shisham and khair.
Laldháng 1 ...	656	Contains the basin of the Rigoha-ká-nála, which winds round from the north-west to the south-west in its downward course. The aspects are north-west, north-east, west, south-	To the north precipitous; to the south 15° to 30° in upper parts, precipitous lower down.	...	Sandstone and marl, the latter being most abundant in the north portion.	A mixed sál, kokat and chír forest on the upper slopes; near the village site sál is also found, but not everywhere. On the lower slopes and in the north portion there is usually a mixed forest, with some chír on the higher ridges. Scat-	Sál 4, sain 5, chír 7.	Upper slopes 6, near village 4 to 9, lower slopes and in the north 4 to 5.	6 where not destroyed by fire.	Selection fellings to be made if the trees can be sold even at low rates.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
		west, and south-east. In the north the ground is almost everywhere precipitous and scarped. In the south the upper portions have more moderate slopes, but the lower parts are usually precipitous. To the east is a deserted village site (Rigchagaon).				tered bamboos of fair quality are found throughout. They are more abundant, but of inferior quality near the nála.				
Laldhang 2 ...	617	Consists of the upper basin of the Sigadi sot and of some slopes lower down to the west of the sot. Aspects chiefly east, but also south-east, south-west and north-west.	Usually precipitous with ledges having an incline of 20° to 35° between the precipices.	...	Sandstone and marl, the latter being most abundant in the north portion.	Generally a poor mixed open forest on the ledges. A few small areas are better stocked with a mixed forest containing sál. Bamboos fairly abundant, but overcut.	Sál 4 ...	Mixed open forest 3 to 4, mixed sál forest 5 to 6.	6 in a few patches, but as a rule wanting.	Dry wood, bamboos and minor produce to be removed, and green trees sold if a market can be obtained for them.
„ 3 ..	873	Comprises the upper basin of the Buddal sot and of some slopes lower down to the east of the sot. Aspects mainly west, but also south-west and east.	Usually precipitous, but in the south-east some stretches between the precipices with slopes of 20° to 30.°	...	Ditto ...	In the sandstone ledges there is usually a mixed forest of sál, sain, &c., with chír on the higher slopes. The sál is vigorous, but suffers from fires. In the higher parts to the north there is usually a mixed forest of chír, sandan, kat-bhilawas, &c., whilst elsewhere there is the ordinary mixed forest, with sometimes a few sál. In many parts there are considerable quantities of bamboos of fair quality.	Sál 4 ...	4 to 6 ..	7 in many places where spared by fire.	Ditto.
„ 4 ..	983	Consists of a portion of the western basin of the Buddal sot. The main aspects are north-east, south-west and east.	...	...	Sandstone and marl, but chiefly sandstone.	Usually a mixed forest of sál, sain, sandan, bakli, &c.; on the higher slopes of the south portion there is a little chír, further north sál is found in variable proportions where the soil is not clayey, and elsewhere there is the ordinary mixed forest. Bamboos, but not of very good quality, are found scattered throughout the compartment.	Sal 4 ...	6 to 7 ...	Rare ..	Ditto.
" 5 ...	1,149	Drained by several feeders of the Rawasan nadi. The	Usually above 30.°	...	Sandstone, soil superficial.	Generally a mixed sál forest on north-west and north-east slopes, whilst	Sál 4 ...	Sál forest 5, mixed forest	Fairly good ...	Selection fellings to be made if the

		ground is much cut up and the banks of the feeders are very precipitous. General aspects north-west, but south-west and north-east aspects are also common.				the more unfavorable slopes are covered with a mixed forest, containing, however, a notable proportion of sain and bakli. Chír is found on the highest ridges. The bamboos are not very abundant and their quality is inferior.		2 to 3.	...	trees can be sold even at low rates.
Rawasan 1 ...	555	Situated along the south banks of the Rawasan nadi. The main aspects are north-east and north-west. Near Katla paráo there is a strip of almost level ground.	Usually very steep or precipitous; but small areas with more moderate slopes of 20° are not uncommon.	...	As in Sigadi 1 ...	Very variable. On the steep slopes the forest is very open and mixed, consisting of dhaura, kat-bhilawa, sandan, some sain, &c., whilst sál occurs on the more moderate slopes where it usually forms a pole forest. Large trees are conspicuous by their absence; bamboos are found almost everywhere, but chiefly on steep ground and in gullies, where they are of fair quality.	...	Sál forest 5, elsewhere 2 to 3.	5 in the few patches spared by fires.	Dry wood, bamboos and minor produce only to be removed.
" 2 ...	695	Also situated on the south bank of the Rawasan, but below Rawasan 1. The main aspect is north, but west, north-west, north and north-east aspects are all represented. Many level strips along the bank of the stream.	Usually steep, and a small area in the west precipitous, whilst opposite Baori many of the slopes are more moderate.	...	Ditto ...	On the sandstone, where the slopes are not too steep, there is a sál pole forest as in Rawasan 1, elsewhere there is a mixed forest of various species, chiefly kokat. Bamboos are found almost everywhere, but are most abundant in depressions and on the flats at the foot of the slopes; they seem to have been rather overcut in the more accessible portions,	Sál 4 ...	Ditto ...	Ditto ...	Ditto.
" 3 ...	1,095	Much cut up by numerous small streams running into the Rawasan nadi on the south-east, the largest being the Khodiarwali sot; ground generally precipitous.	Usually over 30.°	...	Sandy, with the sandstone rock frequently exposed.	Kokat predominates, but there is a fair quantity of sain and sál on the more moderate slopes, whilst on those facing south bakli is common mixed with numerous kokat.	Sál 3 to 4 ...	4 ...	Indifferent ...	Dry wood, bamboos and minor produce to be removed and standing trees if they can be sold.
" 4 ...	628	The south part comprises the basin of the Dungadi Dún sot flowing into the Rawasan in a south-west direction.	Varying from 15° to scarps. In the north very precipitous.	...	Ditto ...	Kokat with a large proportion of sál and sain on the more favorable slopes, and of bakli and sandan on the exposed aspects. Some chír on the higher ridges.	Sál 4 ...	5 ...	Fair, especially of sál.	Ditto.
" 5 ...	1,334	Contains the basins of several tributaries of the Luni sot as fas as the forest boundary running into the sot on either side in north-west and south-east directions.	Seldom less than 30° and scarps not uncommon.	...	Ditto ...	Chiefly kokat with a fair amount of sál and sain on the cooler north and east slopes. On the south faces a scattered mixed forest of kokat, dhaura, bakli and sain with a little gosam.	Sál and sain 4,	Mixed sál forest 8, open mixed forest 2.	Good in places, but frequently checked by a dense growth of creepers.	Ditto.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
Rawasan 6 ...	1,076	Lower portion of the basin of the Luni sot.	Generally above 30.°	...	Sandy, with the sandstone rocks frequently exposed.	Patches of sál saplings are found on the gentler slopes, mixed with sain and kokat, such as kat-bhilawa. On the warmer slopes and on the more precipitous ground kokat predominates, mixed with many sain, bakli, and sandan; some chir are found on the higher ridges. Bamboos are numerous in places only, save to the south-west, where they are both good and abundant, but much damaged by elephants.	Sál 4 to 5 ...	Sál forest 6 ...	Of sál 10 ...	Dry wood, bamboos and minor produce only to be removed.
„ 7 ...	...	Formed chiefly of the basin of a tributary which joins the Luni nadi at the Laldháng-Khára road. The higher portion forms part of an undulating plateau. There is a large flat in the south adjoining the Rawasan.	Occasionally steep; slopes descending from plateau of about 15.°	...	Sandy and marly, with alluvium near the nadi.	Some fair patches of sál occur on the gentler slopes, whilst on the marl tendu is common. On the upper dry slopes kat-bhilawa abounds, together with some sain, sandan and bakli. On the flat there is little save kokat such as ber, grewia, pula, bauhinia, bel and a few khair. The plateau is covered with good bamboos, which have, however, been much damaged by elephants, this being a favourite resort of theirs during the rains.	Sál 4 ..	Very variable ...	Of sál and kokat good.	Ditto.
Sigadi 1 ...	516	Includes the west part of the basin of the Bandaria sot. The main aspects are west and south, but south-west and south-east ones also occur. Along the west boundary is a piece of flat land (Bandaria and Sukha chaors) of about 50 acres in extent and above this before the actual slope commences is usually a narrow terrace.	Usually very steep and above 30.°	...	Sandstone and marl with an alluvial deposit along the stream, soil usually of a fair depth, but owing to want of fire-protection it is being washed away from the precipitous slopes.	A rather poor mixed forest predominates on the slopes, with some denser patches here and there on small stretches of more level ground. Sál is found only in small patches on the north slopes of the Bandaria dhár and near the watershed; on the chaors there is mixed forest of numerous species such as haldu, bakli, kokat, &c. Bamboos are abundant in gullies and on the terraces at the foot of the slopes in the west part. They have been much overcut in the more accessible places.	...	4 to 6 on the chaor.	Very rare ...	Ditto.
„ 2 ...	630	This compartment is contained between the Bandaria and Chamaria sots both flowing	Usually above 30.° In the south corner	...	As in Sigadi 1 ..	A mixed forest save near the ridges where there is sandstone and where the slopes are moderate. Here we	Sál poles 3 to 5.	5 ...	Sál seedlings are rare, but would proba-	Ditto.

			to the south-west with the exception of a Chaor of about 40 acres at the west end; the slopes are usually steep or precipitous. In the south corner, however, there is a little gentler ground.	some slopes of 10° to 15° only.			find an open sál forest of poles mixed with about an equal number of other trees. Bamboos are common but especially in hollows, and at the bottom of the slopes where they have been overcut.			bly crop up freely in favorable places, if fires were excluded.	
„	3 ..	458	Almost perfectly flat ground intersected by a few usually dry nálas running south.	...	...	Alluvial, being a sandy gravel with a large proportion of clay; soil usually superficial, poor and dry.	A very poor open forest composed almost entirely of kokat with a few bakli and haldu. Bamboos of inferior quality are found in scattered clumps.	4 ...	4 ...	Almost *nil* ...	Complete rest is necessary, no green timber must be taken out.
„	4 ..	532	As in Sigadi 3	...	...	As in Sigadi 3 ...	Very similar to Sigadi 3, being an open mixed forest of kokat, such as dhák, semal, bahera, &c. There are a few shisham and khair near the Sigadi.	4 ...	3 to 4 ...	Ditto ...	Ditto.
„	5 ...	529	Between the Chamaria and Jaspar sots, the ground is flat as in the preceding two compartments; east of the Jaspar sot it becomes undulating and consists of the last extremities of the spurs which come down from the hills.	...	...	Alluvial and clayey and of a fair depth in the valleys only.	In the western part very similar to Sigadi 3, but there are larger blanks, one being 15 acres in extent. East of the Jaspar sot the stock improves and clumps of trees, such as semal, rauni, and a few bakli become denser, whilst rising on the spurs sál occurs well mixed with tendu of bad quality, kat-bhilawa, sandan, &c.; near the Naddiwála sot, the forest is again more mixed with a larger percentage of bamboos, which are scanty in the rest of compartment.	Sál 3 ...	4 to 5 ...	Rare	Ditto.
„	6 ...	894	Consists of the eastern side of the valley of the Chamaria sot, which at first running to the south-east, lower down alters its course to the south-west. The main aspects therefore vary from south-west to north-west. There is flat or gently rising ground near the cart track.	Usually steep, very steep or precipitous.	...	As in Sigadi 1 ...	A mixed forest with patches of mixed sál forest on the gentler slopes. Bamboos are found near the cart track and in Chamaria sot, but have been much overcut. They are also found on the slopes, but scattered and chiefly in cool places.	Sál 4 to 5 ...	Mixed forest 5, Mixed sál forest 5 to 6.	4 where spared by fires.	Dry wood (all fallen shisham and khair) fuel, bamboos and minor produce only to be removed.
„	7 ...	864	Comprises slopes on both sides of the Raudiawála dhár, which runs in general north and south. There is some gentle ground along the cart track.	In the west rugged, and precipitous towards the north-west; many slopes below 30.°	...	Ditto ...	Near the junction of the Jaspar and Raudiwála dhárs is a fairly good mixed sál forest. The steep slopes are very badly clothed with a mixed open forest which improves in density near the cart track, especially towards the west. Bamboos are fairly abundant just above the cart track, but are scattered elsewhere.	Sál 5 ...	Mixed sál forest 7 to 10, elsewhere 3 to 5.	Rare ...	Ditto.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
Sigadi 8 ...	783	Contains the basin of a number of affluents of the Mali sot running south-east which is thus the main aspect. Rocky and precipitous, especially the northern part, which is very rugged, the spurs being very sharp and the side spurs mere ledges. Near the sources of the streams the slopes are often more moderate.	Usually precipitous.	...	Sandstone and marl; soil superficial, except on gentler slopes and in hollows.	Generally a poor mixed open forest, but on the more moderate slopes a mixed sál forest is found. Bamboos of fair quality are found scattered throughout the compartment, but are more abundant on the more moderate slopes of the marl near the Mali sot.	Sál 4 to 5 ...	Mixed forest 4, mixed sál forest 4 to 5.	Would be good for sál if its seedlings were not annually burnt down.	Fuel, dry wood, bamboos and minor produce to be removed.
„ 9 ...	723	Comprises the basins of three large tributaries of the Mali sot, all running west or south-west. Under the main ridge, near the Mali sot, the ground is usually scarped or precipitous; less precipitous ground occurs more frequently in the south half.	Usually precipitous, some times only 20° to 30° in the south.	...	As in Sigadi 8 ...	Sál is pretty common on the more moderate slopes with north aspect, but it also occurs in less abundance on similar slopes with a south aspect. On the higher rocky slopes there is mixed forest with a good sprinkling of chír (not valuable owing to the inaccessibility of the ground), elsewhere there is the ordinary mixed forest. Bamboos of good quality are scattered throughout, but chiefly in hollows.	Sál 4 to 5 ...	5 to 6 ...	Of sál abundant where spared by fires.	Fuel, dry wood and bamboos to be removed and selection fellings to be made if the trees can be sold.
„ 10 ...	1,176	Contains the northern part of the basin of the Suawála sot, the main aspect being south, whilst a small area to the west drains directly into the Mali sot.	Variable ...	...	As in Sigadi 8, but soil usually deeper.	Usually a sál pole forest on the gentle slopes with a mixture of other species, especially kokat and sain. Bamboos are pretty common throughout, but most abundant in sheltered places.	Sál 4 to 5 ...	Sál pole forest 5 to 6.	Of sál much checked by fires.	Dry wood to be removed; thinnings might be made in the sál pole forest where found necessary.
„ 11 ...	1,322	Comprises the slopes on either side of the Suawali dhár running from east to west, hence the main aspects are north, south and west. The configuration resembles that of Sigadi 10, but towards the south-west the ground is more broken.	...	Variable ...	As in Sigadi 7 with narrow strips of alluvium near the sots.	In the western third of the compartment sál is rare and the stock consists of an open mixed forest with plenty of bamboos near the foot of the hills and near the ridges, but these are somewhat overcut. The eastern part is much better stocked with sál poles on the gentler slopes, whilst bamboos are found wherever the soil and aspect are not too dry.	In west 4, in east 5 to 6.	In east 5 to 6 ...	Of sál 6 where not destroyed by fire.	Dry wood 7 fuel, bamboos and minor produce only to be removed, except that some thinnings might be made in the sál pole forest.

„ 1 ...	1,498	Included between the Nalgarhi Sot and the Sigadi rau, the northern part facing the former, the southern and larger part the latter stream. The main aspects are north and south.	...	Ditto ...	As in Sagadi 7 ...	On the gentler slopes on the higher ground the usual sál pole forest, mixed with sain and numerous other species is found whilst elsewhere is the ordinary mixed forest of numerous species. Bamboos of indifferent quality occur in abundance along the south and west edges and also in good numbers on higher ground on the more moderate slopes. They are overcut and suffer from fires.	Sál 4, sain 5 ...	4 to 5 ...	5 in the few places where the seedlings have not been burnt.	Ditto, also all dead or fallen shisham and khair to be taken out.
„ 13 ...	608	Flat ground with a slight depression along the banks of the Sigadi rau, formed of the old Papidada closed block.	...	...	Sandy alluvium with probably a substratum of clay at no very great depth.	In the depression near the rau there are fairly dense stretches of khair, shisham, sonjana, &c., the shisham consisting mainly of saplings and small poles, interrupted by open bits of grass land. The rest of the compartment is very badly stocked with scattered kokat such as rauni, bahera, chilla, ber, &c. The blanks are very large and the grass long.	Shisham 6 ...	In depressions, average 6, elsewhere 3.	Shisham and khair 6, of other kinds rare.	Complete rest is necessary, no green timber must be taken out, but all dead or fallen shisham and khair should be removed.
„ 14 ...	1,150	A large flat expanse with slight undulations here and there in the neighbourhood of raus.	...	...	As in Sigadi 3 ...	Bamboos are almost entirely absent. Resembles that of Laldhang 3 save that along the Sigadi rau there are several fine patches of young shisham and khair, the former being of especially vigorous growth, otherwise the blanks are numerous and large.	Ditto ...	Shisham 7 to 8 elsewhere 2 to 3.	*Nil* ...	Ditto.
„ 15 ...	584	As in Sigadi 14	...	...	As in Sigadi 14, but not quite so loose.	Resemb'es that of Sigadi 14, but is not so good owing to the absence of shisham. Bamboos of poor quality are found in a few places only There appears to be much grazing.	...	3 to 4 ...	*Nil* ...	Complete rest is necessary, no green timber should be taken out.
„ 16 ...	792	Comprises the basin of the Buriawala Sot running south-east, the slopes on the right bank of the Buddhal Sot, and some flat or undulating ground and islands along the Sigadi Sot. Aspects chiefly north-east and south-west but east and north-east ones also occur.	Usually over 35° on the hilly portion and frequently precipitous, but slopes of not over 20° sometimes are found near the ridges.	...	As in Sigadi 2 ...	On the hilly ground a mixed forest with sál on the gentler s'opes, which also occurs growing vigorously. but in small numbers on the flat along the Buddal Sot. Some shisham is found forming pole and sapling forest in the south portion of the islands. Bamboos are abundant near the Sigadi and Buriawala Sots and also in some places towards the north and near the ridges.	Sál 4 to 6, Shisham 6.	Mixed forest of sál facing south 3, in north 5 to 6 In sál forest 5 to 6.	7 where spared by fires.	Dry wood, fuel, bamboos and minor produce to be removed.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quantity.	Density.	Reproduction.	Treatment.
Sigadi 17 ...	416	Contains some slopes on the left bank of the Buddal Sot and others on the right bank of the Sigadi Sot The main aspects are east and south-west. The ground is very steep and precipitous with a few small flat spaces on ridges and along the Sot.	Very steep or precipitous in the south a few slopes about 20.°	...	Under-lying rock sandstone, and marl occasionally. The soil is of a fair depth only on the more moderate slopes.	Generally a poor open mixed forest, but on the less precipitous parts a mixed forest of sál, sain and kokat with a fair sprinkling of bamboos.	Sál 3 to 4 ...	4 to 5 ...	*Nil* ...	Dry wood, fuel, bamboos to be removed and trees to be sold if purchasers can be found.
„ 18 ...	467	Consists of the basin of the Raupal-ka-sot and of some precipitous ground along the west bank of the Sigadi Sot.	Almost always very steep and precipitous.	...	...	Usually a very open mixed forest, but sál is found in a few places with gentler slopes. In the higher portions some fine chír is found. Scattered bamboos occur everywhere, but are more abundant and of better quality in some spots in the south portion.	Sál 6 ...	Open forest 3, sál forest 6.	Sál 6, chír 5 for young seedlings, but few established ones.	Ditto.
„ 19 ...	1,085	Includes the basin of the Padiar Sot, which at first running south-west, finally changes its course to the north west, and in the south-west corner of some ground (part of which is a flat) draining directly into the Sigadi Sot.	Very steep and usually precipitous towards the ridges.	...	As in Sigadi 2 ...	The flat along the Sigadi Sot is covered by a mixed forest of numerous species with numerous inferior bamboos along the foot of the hill Mixed forest is also found on most of the lower slopes and chír on the precipitous ground near the top. On the more moderate upper sandstone slopes, there is sál which is of especially good quality in the south-east corner. Bamboos are found scattered everywhere and are abundant in the south-west corner.	Sál in south-east corner 5 to 6.	6 to 7 ...	Of sál 4 ...	Ditto.
„ 20 ...	1,328	Comprises the outer slopes of the hills contained between the Sigadi and Teli Sots, and basin of the Kulanda Sot which runs west into the Sigadi. Aspects mainly south, but a few north There is a belt of level and undulating ground along the foot of the hills.	In the east and north usually over 30,° with numerous precipices. In the west many slopes under 30.°	...	Ditto ...	A mixed forest with numerous dhaura and bakli and on the gentler slopes a sál pole forest, mixed with numerous other species Along the foot of the hills is the usual mixed forest containing haldu, kaim, amaltas, chilla, kumbhi, rauni, &c., with numerous bamboos which are found scattered elsewhere.	Sál 5 ..	Sál forest 5 to 7, mixed forest 5 to 6.	Usually destroyed by fires, but where spared 6.	Dry wood fuel, bamboos and minor produce only to be removed, unless some thinnings are made in the sál pole forest.

„ 21 ...	789	Consists of some precipitous slopes on the west side of the Malan nadi, of the basin of the Dhobiawala Sots flowing south-west, and of some of the outer slopes of the hills. The ground in the north and east portions is very broken and precipitous.	In the south west and south often less than 30.° In the north and east precipitous.	...	Ditto ...	In the south-west portion on the lower slopes there is a mixed forest varying in quality and density according to the slope and the nature of the shelter, whilst on the ridges there is a moderate quantity of sál. Higher up is a very fair sál forest, and this species mixed with numerous other kinds is also found on the higher slopes of the north part where there is no clay in the soil, but where this ingredient is present. The forest is a mixed one. Bamboos are found scattered throughout and are abundant along the foot of the hills.	Sál 4 to 5 ...	5 to 7, but only 3 to 4 for the higher mixed forest on bad slopes.	Usually destroyed by fires, but where spared 5.	Dry wood, fuel, bamboos and minor produce to be removed.
„ 22 ...	910	Contains the basin of three main Sots, two of which flow east and the third south-east into the Malan nadi. The compartment consists mainly of a series of precipices.	Precipitous ...	...	As in 17 Sigadi ...	Very poor and generally an open mixed forest with a few chír trees. It has been omitted from the valuation survey.	1 to 2	2 to 3 ...	*Nil*, except a few non-established chír seedlings.	Dry wood, fuel, bamboos to be removed and trees to be sold if purchasers can be found.
Gwalgarh 1	726	Comprises the right side of the valley of the Gwalgarh Sot which flows in a generally south direction. It contains the basins of several tributaries which flow east and south-east. The main aspect is east.	Usually very steep, scarped or precipitous Towards the south over one-fourth. Of the compartment, slopes vary from 10° to 30° and end with a very gentle incline.	...	Sandstone marl and fairly deep alluvium over the marl beds.	On the gentler slopes and on the alluvium where this is sufficiently thick there is a mixed sál forest. Sál is also found on the sandstone on cool aspects where the slopes do not exceed 35.° Sain is abundant in the north portion and occurs sparingly elsewhere. In the remainder of the compartment the forest is a mixed one. Bamboos of fair quality occur everywhere.	Sál 5 to 6 in the better parts.	Sál forest 6 mixed forest 3 to 5.	The seedlings have usually been destroyed by fires, but in a few places 5 to 6.	To be fire-protected, selection fellings to be made according to the plan, and thinnings where required. Climbers to be cut.
„ 2 ...	635	Composed of the east side of the valley of the Gwalgarh Sot with mainly a west aspect. The south half contains the largest proportion of gentle slopes. The ground is usually precipitous in the basin of the Motabari Sot.	Many of the slopes 20° and under, but sometimes precipitous.	...	As in Gwalgarh 1	A mixed forest of sál, dhaura, bakli, kat-bhilawa, gosam, &c., on the gentler slopes, the sál not being usually very predominant; a large quantity of sain with less sál on the steeper and cooler slopes and a predominance of bakli, sain and sandan on the dry steep slopes. Bamboos are fairly abundant and are usually of good quality.	Sál 4 ...	6 to 7 and on the dry steep slopes 5.	Very few sál seedlings but advanced growth of kat-bhilawa tolerably abundant.	Ditto.
„ 3 ...	639	Comprises the basin of the Jaman Sot, which flows south and south-west and that of a smaller Sot running south-	In the north generally over 40.° In the south	...	Ditto ...	Sál in the shape of poles exists in varying proportions in all but the steepest portions, but is most abundant on the gentle slopes towards	Sál 4 to 6 ...	In the south 6 to 8. In the north 4.	Not abundant most seedlings destroyed by fires.	Ditto.

Description of Compartments (Udepur Range)—(continued).

Number of compartment.	Area.	Configuration.	Slope.	Altitude.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
		west and joining the Jaman Sot, after it leaves the hills. The northern third of the compartment consists almost entirely of very steep, scarped or precipitous slopes, while further south the spurs are broad backed with gentler slopes.	usually about 20.°			the south where it predominates, mixed with other species in about equal proportions, sandan, bakli, dhaura being rather more numerous than the others. On the steep scarped ground towards the north there is an open mixed forest of bakli, sain, kat-bhilawa, &c. Bamboos are generally abundant and of fair quality.				
Gwalgarh 4	745	Includes the basin of the Am Sot running south and slopes to the west of the Sigri Sot. In the north portion the backs of spurs are fairly broad with moderate slopes, but the sides are generally very steep or precipitous. There are a few abandoned fields in the north corner.	Near Am Sot 10° to 30.°	...	As in Gwalgarh 1 ...	Very similar to that of Gwalgarh 3, but sál is more abundant in the northern portion owing to the greater frequency of moderate slopes. There are also a few chír trees at the highest points. Scattered bamboos occur throughout.	Sal 4 to 6 ...	6 to 8 ...	Wherever spared by fires 6 to 7 on the better slopes.	To be fire-protected. Selection fellings to be made according to the plan and thinnings where required. Climbers to be cut.
,, 5 ...	690	Consists of the basin of 3 main Sots flowing in an east-south-east direction into the Bigri-ka-sot.	Generally over 30,° but the backs of some spurs broad and with gentler gradients.	...	Sandstone and marl,	A mixed forest except in a few sheltered places where there are small areas covered with young sál poles. Sain is fairly abundant throughout the compartment.	Sál 3, sain 5 to 6.	5 to 6, but in the sál pole forest up to 8.	Where spared by fires usually 5 to 6.	To be fire-protected. Selection fellings to be made if the trees can be sold at low rate.
Main 1 ...	1,208	Consists of the basins of numerous Sots running in a general west direction into the Malan nadi and of the basin of the Jagdeo Sot running south-west into the Gwalgarh Sot. The main aspects are west and south-west. The northern portion is more precipitous than the southern; in the latter the slopes usually end in broad chaors or at least in gentle slopes.	In higher parts slopes from 25° to precipitous: basin of Nimbuwala Sot slopes 20° to 30.°	...	Sandstone and marl with alluvium at the base of the slope.	Well stocked as a rule; on the chaors there is a good mixed forest with a few scattered sál; higher up on gentler and cool slopes there is a fair sál forest, whilst on the very steep slopes there is a very open mixed forest. Haldu is abundant in the chaors and sain in cool places. Bamboos, usually overcut, abound, especially along the foot of the hills.	5 to 6 ...	On chaors 5, on the gentler slopes 6 to 8, in the open forest 3.	7 where spared by fires. Kat-bhilawa seedlings are abundant, as also are sál saplings in places.	To be fire-protected if possible. Selection fellings to be made according to the plan, and thinnings where necessary. Climbers to be cut.
,, 2 ...	928	Includes the basins of the Chandal and Gangwal Sots,	Generally 30° and over.	...	Ditto. ...	Not very well stocked as a rule, owing to the number of village	5 ...	4 to 6 ...	Usually destroyed by fire-	Trees to be sold if possible, even at

		running north-west into the Malan nadi. The few gentle slopes are usually occupied by village sites such as Chandal and some others on the Ratbilidhar.				sites. On the Ratbilidhar in places there is a very fairly stocked mixed forest of sál, sain, &c, but clearings for fields are being made, and if this continues there will soon be no forest left. On the higher points some chír occurs Bamboos are found scattered throughout the cooler parts of the compartment and attain a remarkable size just below the main ridge.			but where spared 6.	low rates.
Satikhala 1	682	Situated on either side of a long spur, which, running south, forms the watershed between the Sukrau and the Rigri-ka-sot. The aspects are thus chiefly east and west. The slopes are usually very steep or precipitous, and are furrowed by numerous gullies and ravines, giving a very rugged appearance to the whole compartment. In the south portion of the slopes facing east there are, however, some long terraces of former cultivation.	...	...	Alluvium in lower portion and soil deep; elsewhere soil superficial, formed of sandstone and marl, the former predominating.	On the old cultivation and near it there is only a rather mixed open forest, with a few khair, gosam, haldu, &c. The rest of the compartment is usually covered with a very open forest of kokat, sál, sain, sandan, bakli, &c. Scattered bamboos occur throughout, but are most abundant in the north-west corner and along the west and south edges. They have been much injured by wild elephants.	...	2 to 6, varying with the ruggedness of the ground.	1. Advance growth rare.	Climbers to be cut. Trees to be sold, even at low rates if purchasers can be found.
» 2 ...	764	A number of bays grouped around one central spur containing the sources of the Paniali Sot, the Bijara pani and of some Sots running west into the Sukrau. The valleys run in south, south-east, west and north-east directions. The ground is generally very rugged, save some slopes above the Sukrau block and some flat terraces a little above the Sukrau.	Usually very steep but 20° only just above the Sukrau block.	...	As in Satikhala 1 ...	In the easternmost basin there is an open mixed forest with a fair proportion of tolerably good sain. Elsewhere on the marl and alluvium of the lower slopes there is a mixed forest containing a good mixture of sain, bakli, jamun, haldu, &c., whilst higher up on the sandstone there is a rather inferior mixed pole forest of sál and other species. Bamboos chiefly of inferior quality are distributed throughout the compartment.	Sain 4 to 5, sál 4.	Open mixed forest 4, elsewhere 5 to 6.	Where sál grows most favorably, sál advanced growth is fairly abundant 4 and seedlings of other species are scattered throughout 2.	As in Satikhala 1.
» 3 ...	808	This compartment contains the head basin of the Jawargarh Sot running mainly south-west, but also south-east in its upper portion, and of the Gewai Sot running mainly south-west, but also south-east in its lower portion. The slopes are pre-	Very precipitous but in one instance between 20° and 30° only.	1,468—3,311	Sandstone and marl,	On the more even slopes mentioned under configuration there is a very nice young sál forest mixed with sandan, dhaura, sain and other species, elsewhere sál is found on the sandstone ledges and is usually in fair proportion, but below Naltara Rutiba and other rugged places there is only a very	On the even slopes sál 4 to 5.	On the even slopes 7 to 8, open forest 3.	Fires have destroyed most seedlings, but sál saplings occur in patches in fair numbers where this species	Ditto.

Description of Compartments (Udepur Range)—(concluded).

Number of compartment.	Area.	Configuration.	Slopes.	Altitute.	Soil.	Stock.	Quality.	Density.	Reproduction.	Treatment.
		cipitous and rugged, being much cut up by numerous ravines, the chief exception being the east face of the spur running from the Satiklala to the junction of the Gewai and Jawargarh sots where the slopes are moderate and comparatively even, but precipitous immediately over the Sots.				open forest with little or no sál in it. Bamboos of inferior quality are scattered throughout.			grows. Bamboo seedlings not uncommon.	
Sukrau 1 ...	520	About two-thirds of the compartment is a raised plateau inclining gently to the south-east, the remainder in the north-east corner consists of moderate slopes with a south-west aspect.	In the north-east corner 15° to 20.°	...	On the plateau alluvium overlying marl, the former being very shallow in the upper portion. The slopes in the north-east corner consist of sandstone and marl with some alluvium near the bottom.	Very variable. In the upper portion of the plateau there is an open mixed forest; sál gradually mixes in until in the lower portion it forms a fairly pure forest, but the quality of the large trees is inferior. On the slopes at the north-east corner there is a fair proportion of sál. Bamboos, which occur everywhere, are most abundant along the west and south edges. They have been much injured by elephants.	4—6	... 3 in upper part of plateau, 6 in lower portion.	Very variable, sál coming up densely here and there in large patches whilst seedlings of kokat such as rauni and katbhilawa are found throughout.	Fire-protection to be continued, selection fellings to be made according to the plan, and thinnings where necessary Climbers to be cut.
„ 2 ...	612	The counterpart of Sukrau 1. The western part is a plateau inclining gently to the south-west, and in the north-west corner there is some hilly ground with south-east and south-west aspects and somewhat gentler slopes than in Sukrau 1.	In the north-west corner 10° to 15.°	...	As in Sukrau 1 ...	Sál is most abundant about and below the centre of the compartment, where it forms at times a pole forest. A great proportion of the larger trees are unsound. Along the western edge the forest is mixed and open, and in the upper part of the plateau, sál and kokat occur in about equal proportions, but this is probably due to former fellings.	...	Of pole forest 8, of mixed open forest 3 to 4. In upper part of plateau, 5.	Usually abundant.	Fire-protection to be continued, selection fellings to be made according to the plan and thinnings where required.
Gewai 1 ...	707	This compartment consists of ground to the east of the Gewai and Jawar Sots having generally north-west and west aspects, and of the basins of a few small Sots running south into the Kho nadi. At the south-west end the spurs are well	20° to 30° and over.	1,132′-2,818′	Sandstone and marl, with a little alluvium along the Kho nadi.	On south aspects there is an open mixed forest with a few scattered sál, which is much more abundant on west aspects, whilst on the gentler slopes on the sandstone there is a fair mixed sál forest. Sál is also found on the steeper slopes but in a smaller proportion and on the marl it is quite absent	5	.. On south aspects 4 to 5; on west aspects with gentle slopes 6.	A fair amount of kokat advanced growth and of sál where sál grows.	To be fire-protected, selection fellings to be made according to the plan and at the same time thinnings where necessary. Climbers to be cut where found

			rounded and the slopes are moderate; elsewhere many of the spurs are broad-backed, but the intermediate slopes are usually very steep or precipitous.				and replaced by sain and other species. Bamboos are found scattered throughout the compartment, but are usually overcut.				
„	2 ...	540	Contains the basins of half a dozen sots, the largest of which are the Gujrari nála and the Jui Sot, all flowing to the south-east. The main aspect is therefore south-east. With the exception of the old village site of Jui in the east corner, which consists of flat and gently undulating ground containing from 30 to 40 acres, the slopes are, as a rule, very steep, rugged or precipitous.	30° and over ...	1,140′—2,818′	Mainly sandstone with very little marl and with a little alluvium along the Kho nadi.	Sál in varying proportions is found almost throughout the compartment, but is most abundant and vigorous in the higher portions near Jui, where the slopes are gentler and shelter is afforded by a rocky wall; elsewhere the poles are inferior and the large trees are very crooked. Sain, sandan, bakli and dhaura are usually mixed in equal proportions, whilst amongst the kokat, kat-bhilawa is common. Bamboos of somewhat inferior quality are scattered throughout the compartment.	5 in best places; otherwise of poles, 4, large trees 2 to 3.	...	Fires have destroyed most of the reproduction, but some places have escaped, whilst in a few instances the advanced growth of sál, sain and kokat was strong enough to resist.	To be fire-protected. Selection fellings to be made according to the plan and thinnings where necessary. All climbers to be cut.
„	3 ...	448	Contains the basin of one and the south part of the basin of a second main Sot, both running south-east into the Kho nadi. The sides of the valleys are generally precipitous, but along the Kho and the north of the compartment, where there was formerly some cultivation, there are some gentler slopes.	30° to 35,° rarely less.	1,550′—3,300′	Superficial, containing a large quantity of fragments of the underlying rock or often wanting, the underlying sandstone being exposed. A little alluvium near the Kho.	Wherever the slope is not too great there is a mixed sál forest; the sál being usually crooked and of very inferior quality. Mixed with the sál is a fair proportion of sain and sandan with some bakli and dhaura, whilst near the streams some jaman, gosam and haldu are met with. Bamboos of inferior quality are scattered throughout the compartment.	1 to 3	... In the better stocked parts 4 to 5; elsewhere 2.	The advance growth of sál is fairly abundant in places which have escaped fires.	To be fire-protected. Selection fellings to be made according to the plan and thinnings where necessary. Climbers to be cut.

CHAPTER XII.

Determination of the Annual Yield.

120. This is a most difficult problem, and taking into consideration the facts that the species composing the stock are very numerous, that their rate of growth is frequently an unknown quantity, and that this rate even for a single species must vary considerably in different localities, it will be seen that nothing but the very roughest estimate can be made.

There are no trustworthy data as to the rate of growth of any of the trees in the working circle, and such data will have to be collected during the period for which this preliminary plan is prepared, whilst for present purposes it must suffice to take such figures as the following, which seem most suitable to these forests :—

Names of trees.	Exploitable dimensions.	Time required for a III class tree, and in the case of khair, sandan and tendu a IV class tree to become exploitable.	Remarks.
Sál	2′ to 1′-9″	80	In the best forests, trees under 2′ in diameter should not, as a rule, be worked out, but in many places these species are probably mature before attaining this size.
Sain	2′ to 1′-9″	80	
Haldu	2′	80	
Bakli	1′-9″—1′-6″	40	
Dhaura	1′-6″	40	
Gosam	1′-9″	40	
Shisham	2′	30	
Khair	1′	25	
Jaman	2′	80	
Sandan	1′	30	
Tendu	1′	30	
Chír	2′	80	
Kokat	1′-6″	30	The rate of growth and exploitable dimensions vary greatly according to the species, but this perhaps will be a safe average figure to take for the timber-yielding kokat.

It being then assumed that it will take a 3rd class tree 80 years to become exploitable in the case of sál, sain, haldu, jaman and chír, 40 years in the case of bakli, dhaura and gosam, 30 years in the case of shisham and kokat, 25 years for IV class khair and 30 years for 4th class sandan and tendu to enter into the 3rd class, at which size they are exploitable, it will be possible to work out all the 1st and 2nd class trees, and in the case of khair, sandan and tendu the 3rd class ones as well within the periods mentioned, provided that a sufficient number of the lower classes exist to replace the ones exploited, and that the general state of the forest is satisfactory.

121. If this was the case from the statistics previously given for each kind of tree in chapter V, the number of mature trees (sound and unsound) given below could be worked out annually :—

Names of trees.	Udepur accessible forest.	Gori accessible forest.	Udepur and Gori inaccessible forests.	Total.
Sál	206	238	144	588
Sain	97	110	336	543
Haldu	67	71	36	174
Bakli	213	664	139	1,016
Dhaura	121	138	42	301
Gosam	26	171	15	212
Shisham	*Nil.*	44	*Nil.*	44
Khair	14	88	15	117
Jaman	25	16	29	70
Sandan	144	619	178	941
Tendu	127	52	9	188
Chír	1	*Nil.*	22	23
Kokat	1,483	1,736	295	3,514
Total ...	2,524	3,947	1,260	7,731

CHAPTER XIII.

THE WORKING PLAN.

122. It is proposed to group the compartments together and to form three series, thus :—

Nos of Series.	Names of Series.	Names of Compartments.	No. of Compartments.	Area of workable forest.
				Acres.
I.	Accessible forests, Udepur range.	Gewai 1, 2 and 3 ... ... Sukrau 1 and 2 ... ... Gwalgarh 1, 2, 3, and 4 ... ... Malan 1 ... ... Sigadi 1 to 8, 10 to 17, 20 and 21 ... ... Rawasan 1, 2, 6 and 7	31	21,458
II.	Accessible forests, Gori range.	Luni 2, 4 to 7, and 9 to 11 ... ... Mundhal 1 to 12 ... ... Jogichaur ... ... Ander-Majhera 1 and 2 ... ... Dogadda 2 to 7 ... ... Kauria Chaura 1 and 2 ... ... Bedasni 1, 2, 5 and 6 ... ... Kunau 1 to 7	42	37,202
III.	Inaccessible forests, Udepur and Gori ranges.	Sattikhala 1, 2 and 3 ... ... Gwalgarh 5 ... ... Malan 2 ... ... Sigadi 9, 17, 18, 19 and 22 ... ... Laldhang 1 to 5 ... ... Rawasan 3, 4 and 5 ... ... Luni 1, 3 and 8 ... ... Amgadi 1, 2 and 3 ... ... Dogadda 1 ... ... Bedasni 3 and 4	27	11,874
		The Working Circle ...	100	70,534

123. In the Nindhaur Working Circle from the measurements made in sample plots, it was found that it took 32 years for a 2nd class sál tree 4½ feet in girth to pass into the 1st class, and allowing for the more unfavorable condition of growth in the Ganges Division, eight years should be added, making the period one of 40 years. During this period selection fellings will have to be made over the whole of the Working Circle; but owing to want of information on many important points, it has been considered best to prescribe the details of work for 10 years only, after which it will be necessary to revise the arrangements now advocated. For sylvicultural reasons it would have been preferable to prescribe that the entire area should be worked over four times in the 40 years instead of once only as proposed. If this were done the present mature stock would doubtless be more fully utilised and a number of unsound trees could be exploited within the first 10 years which will have completely decayed before the compartments are worked in which they exist. It, therefore, becomes necessary to explain why this course has not been adopted.

(1).—Fire-protection, which is in a very backward state in the division, would have to be extended at once over the entire area of the Working Circle, and the forests being particularly difficult ones to protect, it is considered more prudent to carry out this essential measure gradually and not with a rush.

(2).—The exploitable trees in the Working Circle are very scattered and if the entire area were worked over in 10 instead of in 40 years, this difficulty would be increased fourfold and a contractor who had purchased say 200 sál trees, would have to wander over six or seven square miles of forest in search of them.

(3).—The labour of marking the trees and the difficulties of supervision would be increased in a like rati

(4).—From para. 128 of the plan, it will be seen also that a large area of the accessible forests amounting to nearly 23,000 acres should not be touched for the next 10 years and probably for a much longer period owing to its impoverished condition.

(5).—There will, of course, be a certain loss in allowing old and decaying trees to remain so long standing, but this loss will really not be so considerable as might at first appear. A large number of these decaying trees, especially in the case of sál, are already quite unmarketable, and in the greater part of the area which is not to be touched during the next 10 years, heavy fellings were made formerly and the sound exploitable trees are much more scattered than in the parts selected for working whilst as such trees seldom exceed two feet in diameter, the larger ones having been previously extracted, they will remain sound for a long period.

The question of the utilization of the mature trees which will be left after selection fellings have been made in the compartments which are to be worked, should be deferred until the 10 years have expired for which definite working has been prescribed. At present it is impossible to predict with any certainty whatever either the success of fire-protection or the quantity of young growth which may be obtained as the result of such protection. The young trees now occupying the ground have ample room to expand, too much so in most cases, the density of the forest being almost always very slight. To make any provision now for re-working these compartments, paying attention to the requirements of young growth, which is at present non-existent, would, it is considered, be premature. The proposals in the plan do not, however, in any way prevent a re-arrangement of the system of working at the end of 10 years when a revision is provided for, and if at the end of that period it is considered advisable to work through the forests twice or thrice before the end of the 40 year period there is nothing in the present plan to prevent such a course being adopted.

During the first 10 years therefore it is proposed to make selection fellings over about one-fourth of the forest area, and after taking into consideration the demands for forest produce and the conditions detailed in para. 120, the compartments which it is proposed to work are—

Nos. of Series.	Names of Series.	Names of compartments.	No. of Compartments to be worked.	Area to be worked.
				Acres.
I.	Accessible forests Udepur.	Rawasan 1, 2 and 6 ... ... Gwalgarh 1, 2, 3 and 4 ... ... Sukrau 1 and 2	10	5,805
II.	Accessible forests, Gori,	Ander-Majhera 1 and 2 ... ... Kunau 1 ... ... Bedasni 1 2, 5 and 6	8	6,395
III.	Inaccessible forests, Udepur and Gori.	Rawasan 4 (part of) and any other compartments,	7	2,968
			(approximate only).	
		Total ...	25	15,168

124. The table given in para. 121 represents the number of trees which can be felled annually, provided that the following principal conditions are fulfilled :—

1*st*.—The trees of the class immediately lower than the ones worked out to be at least from three times in the case of sál to 15 times in the case of sandan as numerous as the latter.

2*nd*.—A large and well-distributed stock of seedlings on the ground.

3rd.—Immunity from fire.

4th.—Absence of excessive grazing.

5th.—The co-efficient of density to exceed 5.

From the particulars given in chapter V it will be seen that the first condition is fulfilled as regard sál, shisham, khair, sandan, tendu and kokat, but that this is due not to the satisfactory state of the forests, but to the fact that in the case of the first three species nearly all the large trees have been worked out, and also in the case of shisham and khair to the action of floods, whilst in the case of the last three species it is due to the fact that very large proportion never attain large dimensions. This condition, however, is not fulfilled as regards the other species, *viz.*, sain, haldu, bakli, dhaura, gosam, jaman and chír, and the cause of this may be attributed partly to fires and partly to the probability that, as far as these particular species are concerned, the forest has been underworked, but in the case of haldu it may be almost entirely attributed to the absence of reproduction.

The second condition is scarcely ever fulfilled owing to the prevalence of forest fires and in some instances of excessive grazing (conditions 3 and 4), and therefore a number of mature trees will have to be left for seeding purposes, whilst the density is only sufficient over a portion of the forest. It must be recollected, however, that except in the best sál forest or in parts where there are no bamboos, it is not desirable to have a very dense stock of trees, especially of inferior kinds, as the bamboos, which form such an important part of the revenue of the division, would disappear under too much cover.

125. Allowing for this state of things, it is proposed, provided that the other suggestions made further on are also carried out, to limit the annual selection fellings during the next 10 years to the following amount :—

Names of species.	Accessible forests, Udepur.		Accessible forests, Gori.		Inaccessible forests.		Total.	
	Number of trees.	Wrought timber, cubic feet.	Number of trees.	Wrought timber, cubic feet.	Number of trees.	Wrought timber, cubic feet.	Number of trees.	Wrought timber, cubic feet.
Sál	100	1,800	50	900	50	900	200	3,600
Sain	80	2,400	50	1,500	200	6,000	330	9,900
Haldu	50	3,500	50	3,500	30	2,100	130	9,100
Bakli	100	1,000	400	4,000	75	750	575	5,750
Dhaura	100	1,000	60	600	50	500	210	2,100
Gosam	10	120	100	1,200	*Nil.*	...	110	1,320
Shisham	...	...	*Nil.*				*Nil.*	
Khair	...	...	*Nil.*				*Nil.*	
Jaman	30	750	20	500	20	500	70	1,750
Sandan	...	...	Unrestricted.				?	...
Tendu	...	...	Do;				?	...
Chír	...	...	*Nil.*		30	210	30	210
Kokat	500	6,000	600	7,200	200	2,400	1,300	15,600
Total ...	970	16,570	1,330	19,400	655	13,360	2,955	49,330

Dry trees to be sold wherever they may be found.

It will probably not be possible to work the inaccessible forests to their full extent for a long time to come, but every endeavour should be made to do so by fixing lower rates for their produce than those levied in the other parts of the division.

In marking trees for these fellings, those possessing dimensions given in para. 120 should be selected as much as possible; but in cases where many of the 2nd or even 3rd class trees have reached maturity, such trees may also be chosen, and this

may often have to be done in the case of such species as bakli and dhaura. The improvement of the forest should be made the first consideration, and unsound trees whose removal would be beneficial should be included in the marking, if it be possible to sell them even at minimum rates.

The fellings must be distributed as regularly as possible throughout each compartment and not confined to certain portions only.

126. The compartments in which it is proposed to make selection fellings during the next 10 years, and the number of trees which may be taken from each, will now be given :—

Selection fellings to be made during the next ten years.

Compartment.	No. of compartment.	Name of tree.											Number of trees to be felled per acre.
		Sál.	Sain.	Haldu.	Bakli.	Dhaura.	Gossam.	Sandan and tendu.	Jaman.	Chir.	Kokat.	Total.	
Rawasan ...	1	50	...	...	100	...	20	Unrestricted.	...	...	200	370	0·74
Ditto ...	2	90	60	10	...	100	...		10	...	800	1,070	1·61
Ditto ...	6	210	500	20	300	50	10		...	...	150	1,240	1·27
Ditto ...	7	...	...	...	...	50	10		...	..	1,100	1,160	2·11
Gwalgarh ...	1	40	60	40	100	250	...		60	...	500	990	2·16
Ditto ...	2	60	80	60	150	70	...		...	...	500	980	1·79
Ditto ...	3	100	50	30	150	80	...		30	...	500	910	2·13
Ditto ...	4	150	50	40	200	40	...		...	...	250	760	1·13
Sukrau ...	1	130	...	...	...	20	...		30	...	500	680	1·45
Ditto ...	2	170	...	30	...	...	...		30	...	500	730	1·27
Other compartments.	...	...	...	270	...	340	60		140	...	...	810	...
Accessible forests Udepur.	...	1,000	800	500	1,000	1,000	100	...	300	...	5,000	9,700	1·67
Ander-Majhera...	1	70	...	10	...	360	30	Unrestricted.	60	...	800	1,330	1·80
Ditto ...	2	350	40	..	...	60	50		60	...	600	1,160	2·03
Kunau ...	1	...	30	50	800	60	400		...	...	300	1,640	1·85
Bedasni ...	1	...	80	230	800	...	200		20	...	400	1,730	1·84
Ditto ...	2	...	80	30	100	...	40		...	...	500	750	1·22
Ditto ...	5	...	20	150	1,200	...	100		...	...	900	2,370	1·72
Ditto ...	6	...	250	...	600	90	80		...	...	1,600	2,620	2·06
* Accessible forests Gori.	...	420	500	470	3,500	570	900	...	140	...	5,100	11,600	1·83
* Inaccessible forests, fellings to take place in Rawasan 4 (part of) and any other compartments.	...	500	2,000	300	750	500	...	Unrestricted.	200	300	2,000	6,550	About 1·85
Grand Total ...	...	1,920	3,300	1,270	5,250	2,070	1,000	...	640	300	12,100	27,850	1·78

* As the compartments which are to be worked in Udepur contain very few haldu, dhaura and jaman, it is proposed to permit the numbers given above to be worked out from other compartments. Mundhal seven in Gori which it was at first intended to work has been excluded from the table owing to the difficulty of protecting it from fire, hence the total number of trees to be exploited in that series is a little below that prescribed in para. 125.

The order in which these compartments are worked is immaterial and must be left to the discretion of the divisonal officer.

127. After work has been completed in them, they will be allowed to rest for 40 years, and at the end of that period, taking 1 to represent the present number of

1st and 2nd class trees, the numerical improvement which may be expected in these classes may be stated thus :—

Name of species.	Accessible forests, Udepur.	Accessible forests, Gori.	Remarks.
Sál	2·3	1·5	
Sain	1·3	1·2	
Haldu	0·9	1·0	
Bakli	0·9	1·0	
Dhaura	1·0	1·1	
Gosam	2·4	1·2	
Shisham	...	...	No figures can be given for shisham and khair, as these trees are almost completely at the mercy of the annual floods.
Khair	...	...	
Jaman	1·5	·9	

As it is doubtful to what extent the inaccessible forests can be worked or whether they will even be touched during the next 10 years, no estimate as to their improvement or deterioration can be made.

128. *Thinnings.*—The table of density in Appendix J shows that, as a rule, thinnings are far from being required over the greater part of the working circle, but cases do occur in which they would be useful, and it might be necessary to undertake them in other cases, when not detrimental to the forest, in order to keep the market supplied with the requisite number of poles, the demand for which has, however, lessened by the Canal Department obtaining their supplies from the Dehra Dún Division. Any thinnings which may be necessary in the compartment selected for working in the next 10 years should be made about the same time as the selection fellings, and the divisional officer, when marking trees for the latter purpose, will be able to determine in what parts of the compartment thinnings are required, as for instance, over aportion of the plateau in Ander-Majhera.

Besides the compartments in which selection fellings are to be undertaken, poles might also be cut in other parts, provided that the conditions mentioned in the succeeding paragraph are not infringed, and a number of poles could thus be extracted from the Dudli maidan, from Kauria Chaur 2, Dogadda 2, and portions of Sigadi 10, 11 and 12. No poles should, however, be cut in the following compartments: Kunau 2, 3, 4, 5, 6 and 7; Mundal 1, 2, 3, 4, 5, 6 and 8; Jogichaur; Dogadda 1, 4, 5, 6 and 7; Luni 5, 6 and 9; Sigadi 3, 4, 5, 13, 14 and 15.

129. Only those poles should be extracted which are dominated or defective or which will never become 1st class trees, and they should not be cut in places where the forest is open. It is of the highest importance that the greatest care should be taken in these operations, as if for the sake of present revenue, the best poles are cut down, the whole future of the forest is endangered and no improvement can be expected either in the quality or quantity of timber produced.

130. The supply of fuel exceeds the quantity at present exported, and this will probably continue to be the case for a great number of years. If dry wood is not sufficient to meet the annual requirements, green trees will have to be felled, inferior badly-grown kokat being chosen, which are useless for other purposes, and these trees should be taken as far as possible from the compartments in which selection fellings are being made; but if purchasers so desire, fuel may be sold to them in any other compartments with the exception of Mundal 1, 2, 3, 4, 5, 6 and 8; Jogichaur; Dogadda 1, 4, 5, 6 and 7; Luni 5, 6 and 9; Sigadi 3, 4, 5, 13, 14 and 15, and the chaors in the Kunau block.

131. *Improvement fellings.*—It is to be hoped that in those blocks which are to be fire-protected, the result will be a large crop of seedlings at the end of 10 years over a great part of the closed area, and if this surmise turns out to be correct,

improvement fellings, *i. e.*, the extraction of the decaying, crooked and hollow trees can be undertaken; but it is not proposed to make any at present except in Kauria Chaur 2, where old unsound sál might be taken out in places where the advanced growth would benefit by the operation.

132. *Bamboos.*—The new orders for controlling bamboo cutting have been explained in para. 65, and are excellent in theory, but it seems difficult, with such a small establishment, to carry them out effectively in practice. If after further experience this proves to be the case, an alternative scheme would be to fix a rotation of three years, two-thirds of the forest area being closed at a time. This would of course cause a falling off in the revenue to begin with, but would in the end prove advantageous by improving the stock and consequently enhancing the revenue, and by making the control over the bamboo cutters much more effective.

In determining the portions to be worked triennially, it is important to remember that the area open to the export of bamboos for any particular year must not be confined to one portion only of the forest, as this would greatly interfere with trade; but the open and closed blocks should be well distributed, so that bamboos, as at present, may be brought out annually by all the main export lines, and the following division of the blocks into three groups, each group to be worked every third year, is considered the most suitable:—

Names of Blocks.	Area in acres.	Names of Blocks.	Area in acres.	Names of Blocks.	Area in acres.
GROUP I.		GROUP II.		GROUP III.	
Gewai	1,695	Sukrau	1,132	Satti khala	2,254
Gwalgarh ...	3,435	Malan	2,136	Sigadi, south (compartments 13, 14, 15, 18, 22).	6,921
Sigadi, central (compartments 9, 10, 11, 12, 16 and 17).	5,927	Sigadi, north (compartments 1—8).	5,206		
Rawasan	5,933	Luni, south (compartments 1—5).	5,909	Laldhang	4,278
Amgadi	3,135	Mundal, south (compartments 1—5).	4,235	Luni, north (compartments 6—11).	7,346
Kauria Chaur ...	2,118	Ander-Majhera ...	1,410	Mundal north (compartments 6—10).	4,048
Kunau 5 (compartments 1, 2, 3. 4).	3,077	Dogadda (compartments 1—5).	3,590	Jogi chaur	788
		Bedasni	6,304	Kunau, north (compartments 5 to 7).	4,239
Total ...	26,220	...	29,922	...	29,874

133. As however, the sudden introduction of this system would be a serious falling off in the revenue, it will be best to introduce it gradually, and by the following method the rotation will be completely established in the course of six years.

The three groups are each divided into two sub-groups, as follows:—

Group I	Blocks.	Area of sub-group.	Group II.	Blocks.	Area of sub-groups.	Group III.	Blocks.	Area of sub-groups.
		Acres.			Acres.			Acres.
I*a*.	Gewai ... Gwalgarh ... Sigadi, central...	11,057	II*a*.	Sukrau ... Malan ... Sigadi, north . Luni, south ...	14,383	III*a*.	Sattikhala ... Sigadi, south ... Laldhang ...	13,453
I*b*.	Rawasan ... Amgadi ... Kauria Chaur ... Kunau south ...	15,163	II*b*.	Mundal south, Ander-Majhera, Dogadda ... Bedasni ...	15,539	III*b*.	Luni, north ... Mundal north ... Jogi, Chaur ... Kunau, north ...	16,421
		26,220			29,922			29,874

These sub-groups can then be opened and closed as below, supposing the system started in 1887 :—

Year.	Sub-groups open.	Sub-groups closed.
1887	I*b*, II*a* and *b*, III*a* and *b*	I*a*.
1888	Ditto ...	I*a*.
1889	I*a* and *b*, II*a* and *b* ...	III*a* and *b*.
1890	I*b*, II*a* and *b* ...	I*a*, III*a* and *b*.
1891	I*b*, III*a* and *b* ...	I*a*, II*a* and *b*.
1892	I*a* and *b* ...	II*a*, and *b*, III*a* and *b*.
1893	II*a* and *b* ...	III*a*, and *b*, I*a* and *b*.
1894	III*a* and *b* ...	I*a*, and *b*, II*a* and *b*.
1895	I ...	II and III.
1896	II ...	III and I.

It is immaterial which sub-group of blocks is first chosen as the one to be closed.

4.—Protection from Fire.

134. Until quite recently it has been considered essential that a forest protected from fire should also be closed to grazing, at least in such forests as the Bhábar for the greater part of the forest in the higher hills, such as those of Naini Tal and Jaunsar, have been protected from fire, but open to grazing for many years, with satisfactory results as regards immunity from fires. A beginning, and it is believed a successful one, has been made to introduce this system into the Dehra Dún and Saháranpur divisions of the School Circle, and it would appear to be possible to apply it also with beneficial results to the forests of the Ganges division. From the description of compartments it will be seen how much the forests have been damaged by fires, and what good results might be expected from their protection in the way of better reproduction, increased density, improved soil and a superior quality in the timber grown ; in fact, until these annual fires have been stopped, no substantial improvement on their present unsatisfactory state can really take place, however much cutting may be restricted, and no well regulated plan can be drawn up for working them. The good forests containing sál, &c., if we except those already protected, are so inextricably mixed up with the bad, that it is impossible to separate them for the purposes of fire-protection, save in the case of Gwalgarh 2, 3, 4 and Sigadi 10, 11, 12 and the small sál areas in Luni 5 and 6.

As most of the graziers leave the forests as soon as the rains set in, the Kumaonis for their own vilages and the Gujars for the higher hills, they have no interest in burning the forests to obtain young green grass in the rains but only for a short period in the hot weather, and the head graziers should be induced to co-operate in its protection.

135. What should be aimed at is the protection of nearly the whole of the forests by the system of fire-lines shown on the maps, omitting only a few compartments at the base of the hills, containing principally inferior kokat and grass. In this system the following fire lines are proposed :—

	Approximate length, miles.
Outer fire-lines	100
Inner fire-lines	60
Total ...	160

The latter are formed by the Gewai, Sukrau, Malan, Rawasan, Luni, Mundal, Dogadda and Bheng nadis, by the Gonda Bahera sot, the Mundhal Ghasi Ram road, the Mundhal Dogadda road and by portions of the present fire-lines, around the Sukrau, Jogi Chaur, Ander-Majhera and Kauria Chaur closed blocks.

The length of these lines, it will be seen, is only just a little more than five times that of the present ones, whilst the area protected would be over 80,000 acres or 500 acres for every mile of fire-line, as compared with 205 acres at present.

Most of the fire-lines proposed are either beds of streams or roads except in the case of the upper boundary, and the annual cost of protection may be estimated at Rs. 3,500 or ·7 annas per acre compared with the present rate of 1·17 annas. Sirgirohis or headmen of gots and all the head Gujars should have certain portions of forest assigned to them around their temporary huts, and should be made responsible for all fires occurring in the neighbourhood, being rewarded at the end of the season if protection has been successful.

In the case where village lands occur within compartments, the cultivators might be made responsible in the same way and suitably rewarded if no fires occur.

136. It is not considered advisable to attempt to carry out this scheme at once in its entirety for the following reasons. The ground is difficult, there are large areas subject to rights and the attempt to protect grazed areas is still in an experimental stage so that it is prudent to extend protection slowly and not to risk failure by trying too much. Another important reason is that there are extensive and much more valuable areas in the Central Circle, which have yet to be brought under protection including most of the Kotri Dún, which now forms a part of the same division as the Working Circle.

Under these circumstances, it is proposed to limit protection to the following blocks which will be worked over entirely or in part during the next 10 years or which are already fire-protected :—

Range.	Block.	Area in acres.	Length of fire-line required.
Udepur	* Sukrau...	* 1,132	
	Gwalgarh	3,435	
	Rawassan	5,933	
	Total ...	10,500	40
Gori	* Jogichaur	788	
	* Auder-Majhera	1,410	
	* Kauria Chaur	2,118	
	Dudli maidan	305	
	Buriwala Majhrea	754	
	Kunau	7,972	
	Total ...	13,347	50
	GRAND TOTAL ...	23,847	90

* Already fire-protected.

The proposed fire-lines are thus more than three times the length of the existing ones, and the number of acres protected for every mile of fire-line would be 263 as compared with 205 at present, and as many of the new lines run along beds of streams the cost of burning per mile will be less. The annual cost will not therefore probably exceed Rs. 1,800.

The other compartments which it is difficult to protect, as they are open to rights, but which it is proposed to work are Bedasni 1, 2, 5 and 6. If, however, it be found possible hereafter to protect them, it should be done, but it will be rather difficult as Bedasni is honeycombed with cultivation.

If it be laid down as a maxim that forests open to rights in the Bhábar can never be fire-protected, their deterioration must continue, and they must, in course of time, disappear in accessible places, especially if the demand of right-holders for timber and fuel continues to increase, and their rights to forest produce are not committed or the quantities to which they are entitled definitely fixed.

Sukrau, Jogi Chaur, Ander-Majhera and Kauria Chaur are already protected, but it is proposed to extend the fire-line of the latter block so as to include the good piece of sál forest on Dudli maidan.

The Buriwala-Majhera is an island in the Ganges, and requires no fire-line but the river for its protection ; grazing might be stopped at the beginning of the fire season.

As regards the system of fire-lines mentioned in para. 135 to which the Sigaddi rau should be added, it was intended to have shown them on the map bound up with the report, but this unfortunately could not be done, the maps having been sent direct to the Press from the Conservator's office. The exterior lines following present boundary save where a few compartments near Papidanda are excluded.

With regard to the cost of such protection, the figures are based on the cost per acre in previous years, and on the fact that the number of acres protected for every mile of fire-line by the proposed system is more than double the present number, *viz.*, 500 as compared with 205. I believe the cost of protection to be in a great measure proportional to the length of the fire-lines. The Saháranpur Division is very similarly situated to the Ganges Division, and its forests are protected by fire-lines along the raus in the manner mentioned in para 135. In that division last year (*vide* annual report) 91,029 acres were successfully protected at a cost of Rs. 3,185, whereas the cost of protecting 80,000 acres in the Ganges Division is estimated at Rs. 3,500, which does not therefore appear much too low.

It is to be hoped that the above proposals will have been completely carried out within three years, and in that case endeavours should be made to protect the following additional areas within the 10 years for which working has been prescribed :—

	Acres.
Sigadi 1, 2, 6, 7, 8, 10, 11, 12, 16, 20, and 21	10,637
Dogadda 2 and 3 (exclusive of Dudli Maidan to be previously protected)	1,589
Mundhal 9 and 10	1,466
Total ...	13,692

If this scheme be adopted when the plan comes up for revision 37,539 acres of the accessible forests, including nearly all the most valuable portions, will be under protection, the non-protected area consisting largely of kokat and grass jungle at the foot of the hills.

137. *Grazing.*—As will be seen from para. 84, grazing in the forests closed to rights is, as a rule, not excessive, the number of cattle in the Kunau and Dogadda blocks adjoining the Ganges being, however, much greater in proportion to the area than in the more remote forests. In the Kunau block it is calculated that there are five acres to every head of cattle grazed, but the grazing there is mainly confined to the chaors, not much taking place on the hilly ground, especially on the precipitous slopes towards the upper boundary of the block. As regards these chaors, therefore, there are probably 1¼ acres to every head of cattle, and this heavy grazing has no doubt contributed, together with lack of fire-protection and rather heavy fellings, to bring about the deterioration of the forest. It is therefore suggested that the number of cattle in this block should be reduced by sending them to other parts of the forests, where the grazing is light, and where forest produce has not the same value that it possesses near the Ganges.

138. *Climber-cutting.*—The best plan to adopt is to clear those compartments each year in which the regular selection fellings take place, the ground being gone over systematically by a gang of eight coolies under a forest guard. The results should be noted, as the operation will probably have to be repeated after four years. Climbers might also be cut in all the other fire-protected areas if funds are at any time available.

139. *Reproduction.*—Natural reproduction will be trusted to entirely for the maintenance of the mass of the forests, aided by fire-protection, and by grazing restrictions where considered advisable.

140. In the Working Circle it has been noticed in para. 53 that there are considerable areas partially covered with scattered shisham as in the Buriwala-Majhera, and a report might be drawn up as to whether it would prove remunerative to fully stock such areas by means of transplants. It is regretted that this cannot be done here as the ground would have to be re-examined.

If it was considered worthwhile making a plantation, the best site would probably be the Majhera just mentioned, as it contains large areas in every way suitable for shisham, and secure from ordinary floods, whilst its situation in the middle of the Ganges, six miles from the head of the Ganges Canal, is admirable for export purpose.

141. *Communications and buildings.*—Very little road-making will be required unless trees can be sold from the at present inaccessible compartments, which it has been proposed to work. If purchasers can, however, be found for the produce, export roads will have to be made.

A third class rest-house might be built on the Ganga Ram chaor near Gori ghát, which would be especially useful during the fire season. The present temporary chaukis might gradually be replaced by a better class of huts, and a well would be useful at Papidanda.

CHAPTER XIV.

142. *Suggestions concerning the revision of the present plan.*—There are at present no reliable data from which the calculation of the annual increase can be made.

The annual nature of the rings in sál is open to question, and the rings are very difficult to count; they are indistinct in sandan and altogether absent in haldu, dhaura and gosam.

The only step to be taken under the circumstances is the annual measurement of standing trees, and two sample one acre plots should be chosen for the purpose in Jogichaur and in Gewai 1, the names of the different species included in the present enumeration survey being kept separate in the register.

144. When an officer inspects any particular compartment he should see that the description given in the plan is sufficiently accurate, and correct it where necessary.

145. The stock map is capable of great improvement, and should be corrected as much as possible. A good plan would be to check in each year those compartments where fellings are taking place, and which have to be minutely inspected. A bamboo stock map might also be started, showing the distribution and giving co-efficients of density.

146. In future valuation surveys the kokat should be divided into two classes, those capable of producing good timber forming the first class and all the others being included in the second.

147. The control books ordered by the Forest Code will have to be carefully kept up, and if this is done there will be much valuable data available when this plan has to be revised.

148. When all the maps of the recent survey on the scale of 4 inches to the mile have been published, the compartments, &c., shown on the tracings should be entered on the printed sheets, and the Forest Survey branch should be requested to send the correct areas of all the blocks and compartments, as for the purposes of the present plan these areas had to be calculated from rough and often crumpled tracings, so that they will often be found inaccurate.

N. HEARLE,

Deputy Conservator of Forests.

APPENDICES.

APPENDIX A.

Estimate of the number of acres of each type of forest in each compartment.

Block.	Number of compartment.	Area included in valuation survey.	Sál, kokat.	Sál, kokat, bakli.	Sál, kokat, bakli, sain.	Sál, kokat, sain.	Sain, kokat, sál.	Sain, kokat, bakli.	Bakli, kokat.	Bakli, kokat, sál.	Bakli, kokat, gosam.	Bakli, kokat, sain, gosam.	Kokat.	Kokat, sál.	Kokat, sál, sain.	Kokat, sál, bakli.	Kokat, sál, bakli, sain.	Kokat, sain.	Kokat, bakli.	Kokat, bakli, sain.	Kokat, bakli, gosam.	Kokat, shisham, khair.	Shisham, khair.	Shisham, khair, kokat.	Grass, kokat.	Grass.	Sain, kokat.
		Acres.																									
Gewai ...	1	707	272	...	...	...	...	...	...	...	...	...	215	130	...	...	...	...	...	...	90 (Kokat and Gosam only).	...	...	...	...	...	...
	2	540	333	...	...	...	135	...	...	...	...	...	...	72	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	403	403	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,650	1,008	...	...	...	135	...	...	...	...	...	215	202	...	...	...	...	...	...	90	...	...	...	...	...	...
Gwalgarh ...	1	458	78	...	...	72	...	...	56	...	...	...	70	182	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	535	130	...	...	...	...	...	...	...	...	...	...	254	...	...	...	...	56	...	...	...	...	...	...	...	95
	3	428	352	...	...	...	...	...	...	...	...	...	76	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	4	974	530	...	...	...	64	...	...	...	...	...	...	80	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	496	...	...	...	190	...	...	...	...	...	...	...	...	...	...	...	...	...	206	...	...	...	...	...	...	130
Total ...	...	2,591	1,090	...	...	262	64	...	56	...	...	...	146	516	...	...	...	...	56	206	...	...	...	...	...	...	195
Sukrau ...	1	470	280	35	...	...	...	...	...	...	...	...	40	115	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	574	420	...	...	...	...	...	...	...	...	...	...	154	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,044	700	35	...	...	...	...	...	...	...	...	40	269	...	...	...	...	...	...	...	...	...	...	...	...	...
Sattikhala ...	1	582	122	...	70	...	295 (and dhaura).	...	...	...	...	...	146	...	48	...	...	...	...	...	...	...	...	...	...	...	...
	2	683	...	...	...	193	...	...	...	...	...	...	495	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	513	224	...	45	100	...	...	72	72	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,883	346	...	115	293	295 (and dhaura).	...	72	72	...	...	642	...	48	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX A.

Estimate of the number of acres of each type of forest in each compartment—(continued).

Block.	Number of compartment.	Area included in valuation survey.	Sál, kokat.	Sál, kokat, bakli.	Sál, kokat, bakli, sain.	Sál, kokat, sain.	Sain, kokat, sál.	Sain, kokat, bakli.	Bakli, kokat.	Bakli, kokat, sál.	Bakli, kokat, go-sam.	Bakli, kokat, sain, gosam.	Kokat.	Kokat, sál.	Kokat, sál, sain.	Kokat, sál, bakli.	Kokat, sál, bakli, sain.	Kokat, sain.	Kokat, bakli.	Kokat, bakli, sain.	Kokat, bakli, go-sam.	Kokat, shisham, khair.	Shisham, khair.	Shisham, khair, kokat.	Grass, kokat.	Grass.	Sain, kokat.
		Acres.																									
Malan ...	1	1,013	275	...	...	220	...	.	..	...	...	...	204	...	...	...	...	...	300	...	...	14	...	...	...	...	...
	2	850	..	...	395	...	...	260	...	...	...	...	...	...	...	...	...	195	...	...	...	...	...	...	...	...	...
Total ...	...	1,863	275	..	395	220	...	260	...	...	...	...	204	...	...	...	...	195	300	...	...	14	...	...	...	...	...
Sigadi ...	1	516	...	...	...	...	...	...	...	...	...	...	189	50	...	...	...	..	277	...	...	...	...	...	...	...	...
	2	630	66	...	...	...	...	...	...	...	...	...	500	64	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	458	...	...	...	...	...	...	...	...	...	...	444	...	...	...	...	...	...	...	...	...	...	...	...	14	...
	4	532	...	...	...	...	...	...	...	...	...	...	532	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	539	61	...	...	...	...	...	...	...	...	...	363	61	...	...	...	...	...	...	...	...	...	...	...	44	...
	6	894	147	...	...	..	...	...	...	...	...	...	647	...	...	...	...	...	100	...	...	...	...	...	...	...	...
	7	864	294	...	...	...	...	...	...	...	...	...	287	...	...	...	...	...	283	...	...	...	...	...	...	...	...
	8	340	340	...	...	.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	9	495	..	...	115	380	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	10	866	500	...	...	366	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	11	1,060	305	...	...	...	...	...	...	...	...	...	315	400	...	...	...	...	40	...	...	...	...	...	...	...	...
	12	1,465	240	...	...	...	...	...	...	...	...	...	620	120	...	...	...	...	460	...	...	...	...	...	...	25	...
	13	608	...	...	...	...	...	...	...	...	...	...	496	...	...	...	...	...	...	...	...	...	28	84	...	...	...
	14	1,150	...	...	...	...	...	...	...	...	...	...	899	...	...	...	...	...	...	...	...	40	10	123	...	78	...
	15	584	...	...	...	..	...	...	...	...	...	...	533	...	...	...	...	...	...	...	...	...	...	...	...	51	...
	16	749	240	...	...	...	...	...	...	...	...	...	390	53	...	...	...	...	32	...	...	...	...	20	...	14	...
	17	352	56	...	.	...	88	...	...	...	...	...	160	48	...	...	...	...	...	...	...	...	...	...	...	...	...
	18	166	52	...	...	.	...	...	...	...	...	...	64	...	50	...	...	...	...	...	...	...	...	...	...	...	...
	19	958	173	...	...	70	...	...	35	...	...	...	410	90	...	...	...	...	180	...	...	...	...	...	...	...	...
	20	1,128	255	...	...	.	...	...	...	290	...	...	371	100	...	...	...	...	100	...	...	...	...	...	...	12	...
	21	617	120	60	...	164	40	...	...	60	...	...	162	25	...	...	...	...	40	...	...	...	...	...	...	6	...
	22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	14,261	2,849	60	115	920	128	...	35	350	...	...	7,382	1,011	50	...	...	...	1,512	...	...	40	38	227	...	244	...
Laldhang ...	1	342	170	...	...	..	...	...	...	...	...	...	72	...	100	...	...	...	...	...	...	...	...	...	...	...	...
	2	190	...	...	...	40	...	150	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	384	...	...	...	272	...	112	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	4	610	...	...	...	520	...	.	...	...	...	...	...	...	...	...	...	90	...	...	...	...	...	...	...	...	...
	5	800	...	...	345	252	...	104	...	...	...	...	...	...	...	...	...	99	...	...	...	...	...	...	...	...	..
Total ...	...	2,326	170	...	345	1,084	...	366	...	...	...	...	72	...	100	...	...	189	...	...	...	...	...	...	...	...	...

Rawasan ...	1	500	220	...	...	85	...	...	...	...	...	...	195	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	670	300	...	...	...	...	...	...	...	...	...	320	50	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	881	...	...	80	325	81	130	...	...	...	...	...	...	...	...	...	...	45	220	...	...	...	...	...	...	...
	4	553	...	...	...	209	...	...	...	...	...	...	44	...	90	120	...	...	90	...	...	...	...	...	...	...	...
	5	875	...	...	80	300	...	...	...	...	...	...	...	...	...	...	330	...	...	165	...	...	...	...	...	...	...
	6	988	290	...	...	290	120	...	...	...	...	...	83	...	...	200	...	...	...	...	...	...	...	...	...	...	...
	7	550	190	...	...		...	...	...	...	...	...	360	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	5,012	1,000	...	160	1,209	201	130	...	...	...	...	1,002	50	90	320	330	...	135	385	...	...	...	...	...	...	...
Luni ...	1	766	170	246	...	350	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	725	407	...	...	...	...	...	...	...	...	...	70	248	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	1,170	280	...	120	...	...	...	...	...	...	50 (No gosam.)	...	...	300	...	...	230	...	190	...	...	...	...	...	...	...
	4	1,110	540	...	...	77	...	...	...	...	...	...	359	...	...	...	...	...	70	...	...	64 (No shisham.)	...	...	...	...	...
	5	1,692	103	...	...	...	...	...	...	...	...	...	1,230	43	...	...	...	...	...	...	...	...	24	...	...	292	...
	6	1,258	225	...	...	...	...	...	...	...	...	...	827	...	...	...	...	...	...	...	...	114	92	...	...	...	...
	7	687	...	...	...	...	...	...	...	...	...	...	559	128	...	...	...	...	...	...	...	...	...	...	...	...	...
	8	427	50	...	...	208	...	...	...	...	...	...	...	53	...	...	...	...	...	116	...	...	...	...	...	...	...
	9	1,030	232	...	...	...	...	...	...	...	...	...	321	68	...	64	...	...	345	...	...	...	...	...	...	...	...
	10	862	195	...	...	...	...	...	...	...	...	...	332	200	...	...	...	...	135	...	...	...	...	...	...	...	...
	11	1,660	...	...	...	55	...	...	...	...	...	...	205	45	...	95	...	...	1,190	...	...	30	40	...	...	...	...
Total ...	...	11,387	2,202	246	120	690	...	...	...	...	...	50 (No gosam.)	3,903	785	300	159	...	230	1,740	306	...	208	156	...	...	292	...
Jogichaur ...	1	788	603	78	...	...	...	...	...	...	...	...	87	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Amgadi ...	1	860	...	...	170	390	...	160	...	...	...	...	...	...	...	...	...	140	...	...	...	...	...	...	...	...	...
	2	680	...	...	...	260	300	...	...	...	...	...	120	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	380	...	...	...	140	...	...	...	...	...	240	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,920	...	...	170	790	300	160	...	...	...	240	120	...	...	...	...	140	...	...	...	...	...	...	...	...	...
Mandal ...	1	930	230	...	...	...	120	...	...	...	...	...	...	300	...	...	...	...	180	100	...	...	...	...	...	...	...
	2	580	...	...	...	...	...	...	...	...	...	...	54	...	...	...	...	...	380	146	...	...	...	...	...	...	...
	3	935	...	...	342	...	...	...	...	...	...	...	73	...	...	...	520	...	...	...	...	...	...	...	...	...	...
	4	1,178	245	...	...	...	...	...	...	...	...	...	663	270	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	232	32	...	...	...	...	...	...	...	...	...	100	100	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	1,022	...	...	...	...	...	...	...	...	...	...	92	...	...	...	...	...	922	...	...	...	8	...	...	...	...
	7	856	...	...	...	...	...	...	303	...	...	...	...	293	...	120	...	...	140	...	...	...	...	...	...	...	...
	8	600	...	...	...	...	...	...	...	...	...	...	30	...	...	...	...	...	557	...	...	...	10	...	...	3	...
	9	638	260	...	...	...	...	...	...	...	...	...	10	260	...	...	...	...	100	...	...	...	6	...	...	2	...
	10	766	90	...	...	...	...	...	...	...	...	...	180	398	...	38	...	...	60	...	...	...	...	...	...	...	...
	11	584	...	...	...	...	...	...	...	...	...	...	72	...	...	...	...	...	...	...	...	...	335	...	...	177	...
	12	402	...	...	...	...	...	...	...	...	...	...	110	10	...	...	...	...	...	...	...	...	6	...	...	276	...
Total ...	...	8,723	857	...	342	...	120	...	303	...	...	...	1,384	1,631	...	158	520	...	2,339	246	...	...	365	...	...	458	...

APPENDIX A.

Estimate of the number of acres of each type of forest in each compartment—(concluded).

Block.	Number of compartment.	Area included in valuation survey.	Sál, kokat.	Sál, kokat, bakli.	Sál, kokat, bakli, sain.	Sál, kokat, sain.	Sain, kokat, sál.	Sain, kokat, bakli.	Bakli, kokat.	Bakli, kokat, sál.	Bakli, kokat, gosam.	Bakli, kokat, sain, gosam.	Kokat.	Kokat, sál.	Kokat, sál, sain.	Kokat, sál, bakli.	Kokat, sál, bakli, sain.	Kokat, sain.	Kokat, bakli.	Kokat, bakli, sain.	Kokat, bakli, gosam.	Kokat, shisham, khair.	Shisham, khair.	Shisham, khair, kokat.	Grass, kokat.	Grass.	Sain, kokat.
		Acres.																									
Ander-Majhera,	1	739	138	...	...	...	...	...	...	...	...	...	274	307	...	...	...	...	...	...	...	...	20	...	...	...	...
	2	570	170	...	...	...	...	...	...		...	...	150	250	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,309	308	...	...	...	...	...	...	...	...	...	424	557	...	...	...	...	...	...	...	...	20	...	...	...	...
Dogadda ...	1	770	...	...	...	...	...	...	...	...	...	110	...	660	...	...	...	...		...	...	...	...	...	...	...	...
	2	965	805	...	...	...	...	...	...	...	...	...	460	112	...	...	...	...	80	...	...	...	8	...	...	...	...
	3	798	...	...	...	...	...	...	...	...	...	...	330	460	...	...	...	...	...	...	...	...	8	...	...	...	...
	4	733	...	...	...	...	...	...	...	...	...	...	53	...	...	...	...	...	680	...	...	...	...	...	...	...	...
	5	1,192	...	...	...	...	...	...	...	...	...	...	223	...	...	...	...	...	...	...	...	342	196	130	301	...	...
	6	759	...	...	...	...	...	...	...	...	...	...	134	...	...	...	...	...	...	...	229	...	...	322	..	74	...
	7	963	...	...	..	...	...	...	...	...	...	...	65	...	...	...	...	...	...	...	...	7	14	..	450	427	...
Total ..	...	6,180	305	...	...	...	...	...	...	...	...	110	1,265	1,232	...	...	...	...	760	...	229	349	226	452	751	501	...
Kauria Chaur,	1	1,085	50	...	...	...	...	...	...	...	...	...	900	135	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	870	650	...	...	...	...	...	...	...	...	...	...	220	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,955	700	...	...	...	...	...	...	...	...	...	900	355	...	...	...	...	...		...	...	...	...	...	...	...
Bedasni ...	1	940	...	...	...	...	...	...	...	...	460	...	..	...	...	...	...	...	480	...	...	...	...	...	...	...	...
	2	615	...	130	...	...	...	...	...	...	190	...	135	...	...	...	...	...	160	...	...	...	...	...	...	...	...
	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	1,375	...	...	...	...	...	...	...	...	...	...	527	...	...	...	...	...	848	...	...	...	...	...	...	...	...
	6	1,270	...	...	...	...	...	200	...	...	...	...	270	...	...	...	...	...	800	...	...	...	...	...	...	...	...
Total ...	...	4,200	...	130	...	...	...	200	...	...	650	...	932	...	...	...	...	...	2,288	...	...	...	...	...	...	...	...
Kunau ...	1	886	...	...	...	...	...	...	...	...	...	...	130	...	...	...	...	...	205	...	551	...	...	...	...	...	...
	2	319	...	...	...	...	...	...	...	...	...	...	319	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	1,190	...	...	...	...	...	...	...	150	...	...	220	380	...	...	...	...	440	...	...	...	...	...	...	...	..
	4	1,370	130	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,082	...	158	...	...	...	...	...	...
	5	1,430	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,430	...	...	...	...	...	...	...	...
	6	974	...	...	...	...	...	...	...	...	...	...	760	214	...	...	...	...	...	...	...	...	...	...	...	...	...
	7	1,579	95	...	...	...	...	...	100	...	...	...	160	570	...	...	...	...	300	...	100	...	...	...	...	244	...
Total ...	...	7,748	225	...	...	...	...	...	100	150	...	...	1,589	1,164	...	...	...	...	3,457	...	809	...	...	...	...	244	...

APPENDIX B.

List of minor produce and rates of royalty for 1885-86.

Number.	English or vernacular names.	Botanical names.	*Loaded in carts, royalty—* Per bullock.	Per buffalo.	*Loaded animals, royalty—* Per camel.	Per buffalo.	Per bullock.	Per pony (tattu).	Per donkey.	Per bahangi.	Per head load.	Miscellaneous rates.
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Firewood	...	0 1 0	0 2 0	...	0 1 0	0 0 9	0 0 9	0 0 6	0 0 6	0 0 3	
2	Charcoal	...	1 8 0	1 8 0	1 0 0	0 8 0	0 6 0	0 5 0	0 4 0	0 3 0	0 2 0	
3	Sirwala grass, bamboo leaves ...	Andropogon sp. ...	0 2 0	0 2 6	0 1 6	0 0 9	0 0 9	0 0 9	0 0 6	0 0 6	0 0 3	
4	Bhabar grass	Spodiopogon angustifolium and Eriophorum comosum.	0 6 0	0 8 0	0 6 0	0 3 0	0 2 6	0 2 6	0 2 0	0 1 6	0 0 9	
5	Grass for thatching	..	0 2 0	0 3 0	0 2 0	0 1 0	0 0 9	0 0 9	0 0 6	0 0 6	0 0 3	
6	Reeds, including maltura ...	Phragmites nepalensis, ...	0 6 0	0 8 0	0 5 0	0 3 0	0 2 6	0 2 6	0 2 0	0 1 6	0 0 9	
7	Munj grass	Saccharum munja ...	0 7 0	0 8 0	0 5 0	0 3 6	0 3 0	0 2 6	0 2 0	0 1 6	0 1 0	
8	(1) Singharhu, (2) bindu (3), tát (reeds).	(1) Culms of Anatheri cum muricatum, (2) leaves of other reeds, (3) Saccharum Juscum.	0 7 0	0 8 0	0 5 0	0 3 6	0 3 0	0 3 0	0 2 6	0 1 6	0 1 0	
9	Bark of ber, sain, and bakli ...	...	0 8 0	0 10 0	0 6 0	0 4 0	0 3 0	0 2 6	0 2 0	0 2 0	0 1 0	
10	Bark of sál	...	0 9 0	0 12 0	0 8 0	0 6 0	0 5 0	0 4 0	0 3 0	0 2 0	0 1 6	
11	Canes	...	1 0 0	1 4 0	0 12 0	0 9 0	0 7 0	0 6 0	0 5 0	0 4 0	0 3 0	0 0 3 per piece.
12	Sieve-circles of doldhák ...	Erythrina suberosa ...	2 4 0	2 8 0	1 8 0	1 2 0	1 0 0	1 0 0	0 12 0	0 6 0	0 4 0	0 0 1 per circle.
13	Patera leaves (broad) ...	Typha latifolia for matting.	0 4 0	0 5 0	0 3 0	0 1 0	0 0 9	0 0 9	0 0 6	0 0 6	0 0 6	
14	(1) Patera leaves (thin), and (2) mota.	(2) Cyperus tegetum ...	0 6 0	0 6 0	0 4 0	0 2 6	0 2 0	0 2 0	0 2 0	0 1 0	0 0 9	
15	Leaves of khajur	Phœnix sylvestris ...	0 5 0	0 6 0	...	0 1 6	0 1 0	0 1 0	0 0 9	0 0 9	0 0 6	
16	Leaves of sál, maljan, and dhák ...	...	...	...	...	...	...	...	...	...	0 1 6	
17	Creeper (dhudi)	...	...	...	...	...	...	...	...	...	0 2 0	
18	Pindálu tubers	...	...	...	...	...	0 0 9	0 0 9	0 0 9	...	0 3 0	
19	Bamboo hukka	...	1 4 0	1 4 0	...	0 6 0	0 4 0	0 4 0	0 4 0	0 3 0	0 3 0	
20	Kapasi nuts	Corylus colurna ...	1 8 0	1 12 0	...	...	...	...	...	...	...	
21	Building stones	...	0 8 0	0 10 0	0 6 0	0 4 0	0 3 0	0 3 0	0 2 0	0 1 6	0 1 3	
22	Boulders	...	0 1 0	0 1 6	0 1 0	0 0 9	0 0 6	0 0 6	0 0 6	0 0 3	0 0 3	
23	Chalk, pipe-clay (khaira matti) ..	...	0 3 0	0 4 0	0 2 6	0 1 0	0 0 9	0 0 9	0 0 6	0 0 6	0 0 4	
24	Limestone	...	0 6 0	0 8 0	0 4 0	0 1 6	0 0 9	0 0 9	0 0 6	0 0 4	0 0 3	
25	Lime	...	1 0 0	1 4 0	1 0 0	0 8 0	0 5 0	0 5 0	0 3 0	0 2 6	0 1 3	

APPENDIX B.

List of minor produce and rates of royalty for 1885-86—(continued).

No.	English or vernacular names.	Botanical names.	Measurements.	Quantity or number removed.	Royalty. Rs.	a.	p.	Remarks.
26	Hides of sambar	...	...	Each ...	0	12	0	
27	Ditto deer (large size) ...	...	...	"	0	8	0	
28	Ditto do. (small size) ...	...	...	"	0	4	0	
29	Ditto antelope	...	...	"	0	6	0	
30	Ditto cow, buffalo, horse, donkey, and camel.	...	...	"	0	4	0	
31	Ditto calf (of cow or buffalo),	...	...	"	0	1	0	
32	Ditto sheep and goat ..	...	...	"	0	0	6	
33	Horns of deer and antelope ...	...	...	"	0	2	0	
34	Ditto other kinds ...	...	...	"	0	0	6	
35	Shoes from the higher hills ...	...	...	Per pair ...	0	0	6	
36	Foot-stools (mora) ...	..	...	Each ...	0	1	0	
37	Oar (patha pawsull) ...	...	...	"	0	2	0	
38	Stool (chaukala) ...	...	...	"	0	1	0	
39	Basket, fan, pitara of bamboos (small).	...	...	"	0	0	6	
40	Sticks and fishing-rods (inferior) ...	...	...	"	0	0	2	
41	Ditto ditto (better) ...	...	...	"	0	0	9	
42	Ditto ditto (best) ...	...	...	"	0	1	0	
43	Mats	...	...	Per yard ...	0	0	3	
44	Belan for preparing chapattis, mudda for preparing sweets.	...	...	Each ...	0	0	3	
45	Scales, spoons and sieves ...	...	...	"	0	0	1	
46	Hukka pipe, candlestick, haldu writing tablet.	...	...	"	0	0	6	
47	Gun-stocks, native musical instruments (dutara),	...	...	"	0	2	0	
48	Drums and spinning-wheels ...	...	...	"	0	2	0	
49	Ditto (small) ...	...	...	"	0	1	3	
50	Wooden platters and jars (small) of gainti and khamara.	...	...	"	0	0	9	
	Ditto and jars (large) of semal.	...	...	"	0	0	9	
51	Ditto of gainti and khamara (large).	...	...	"	0	1	6	
52	Ditto of semal and manjholi with a girth of 3 to 6 feet.	...	...	"	0	0	6	
53	Ditto of gainti and khamara (small), girth of 3 feet.	...	...	"	0	0	3	
54	Large jars of (1) gainti and (2) khamara (1).	...	...	"	0	1	0	
55	Gold-washing sieves ...	..	...	Each ...	5	0	0	
56	Stools (pira)	...	...	"	0	1	6	
57	Legs of charpoy of 1st class woods, sál, shisham or sandan.	...	Above 17″ in girth at top.	Per pair ...	0	3	0	
58	Ditto	...	Up to 16″ in girth at top.	"	0	2	0	
59	Legs of charpoy of other woods ...	...	Above 17″ in girth at top.	"	0	1	6	
60	Ditto	...	Up to 16″ in girth at top.	"	0	1	0	
61	Bedstead of 1st class wood ...	...	Legs above 17″ in girth at top.	"	0	12	0	
62	Ditto	...	Up to 16″ in girth at top.	"	0	8	0	
63	Bedstead of other woods having legs.	...	Above 17″ in girth at top.	"	0	5	0	
64	Ditto	...	Up to 16″ in girth at top.	"	0	3	0	
65	Box of 1st class wood ...	...	3′ long and above 61″ in girth.	Each ...	1	4	0	
66	Ditto middle-sized...	..	31″ up to 61″ in girth.	"	0	10	0	
67	Ditto small ...	...	3′ long up to 30″ in girth.	"	0	4	0	
68	Box of other woods	...	3′ long girth above 61.″	"	0	10	0	
69	Ditto middle-sized ...	...	Girth 30″ to 60″,	"	0	5	0	
70	Ditto small ...	...	Girth up to 30″,	"	0	2	0	
71	Cart-wheels, large	...	...	"	1	12	0	
72	Ditto, small	...	...	"	1	4	0	
73	Parts of carts	...	...	"	0	4	0	
74	Khair pestle for sugarcane (churan).	...	...	Per score ...	15	0	0	
75	Ditto (musal) grain ...	...	...	Each ...	0	2	0	
76	Chuglai	...	...	Per load ...	0	0	6	
77	Tairhu bulbs, &c., &c. ...	Dioscorea sp. ...	...	Per maund,	0	2	0	

APPENDIX B.

List of minor produce and rates of royalty for 1885-86—(concluded).

Number.	English or vernacular names.	Botanical name.	Measurement.	Quantity or number removed.	Royalty.	Remarks.
					Rs. a. p.	
78	(1) Findara (bulb-scales), (2) Tarkari-ka-kanja.	(1) Lilium Wallichianum (2) Malva sylvestris.	...	Per maund,	0 2 0	
79	Honey	...	...	"	1 8 0	
80	Wax and kamela (dust off the rauni fruit).	...	...	Per seer ...	0 2 0	
81	Ritha, (2) Dhai flowers ...	(2) Woodfordia floribunda.	...	Per maund,	0 4 0	
82	Dhák flowers	Butea frondosa ..	...	Per seer ...	0 0 1	
83	Pods of Amaltas, unripe fruits of Harra, Bahera, Aonla and Tendu.	...	...	"	0 0 1	
84	(1) Dried fruit of Harra, Bahera, Aonla, (2) fruit of Marorphali and seed of Kharainti.	(2) Helicteres Isora ...	...	"	0 0 3	
85	(1) Fruit of Kat-bhilawa and Rauni, (2) Mocharas, (3) Mochakand.	(2) Gum of Moringa-pterygosperma and Bambox malabaricum (3) Eclipta erecta	...	"	0 0 3	
86	(1) Unripe Pipal, (2) Bilaikand (3) Kalijira.	(2) Pueraria tuberosa, (3) Vernonia anthelmintica.	...	"	0 0 6	
87	Dried pipla	Piper longum ...	...	Per seer ...	0 2 6	
88	(1) Hairhjangi, (2) Kakra Singi and sál resin.	(1) Galls of terminalia chebula (2) galls of Pistacia integerrima.	...	"	0 0 9	
89	Lac of all kinds	...	...	"	0 1 3	
90	Cummin (podiyan)	Cuminum cyminum ...	...	Per maund,	0 3 0	
91	(1) Bael fruit, (2) Hemp, (3) Pitpapra (4) Kairiwa tubers.	(3) Fumaria parviflora, (4) Asparagus demulcens.	...	"	0 4 0	
92	Seed of Gunchi	Abrus precatorius ...	...	Per seer ...	0 0 2	6 annas per maund.
93	Cotton of sinal	...	...	"	0 0 6	
94	(1) Long pepper (Pipla murh), (2) Balcharh, (3) roots of Majethi, (4) Roots of Kutki.	(1) Piper sylvaticum, (2) Nardostachys jatamansi, (3) Rubia cordifolia, (4) Gentiana Kurroo.	...	"	0 1 0	
95	(1) Roots of Kinjora, (2) Flowers of Tun, (3) fruit of Kumbhi, Bacthkandan Isabman.	(1) Berberis lycium ...	...	Per maund,	0 4 0	
96	(1) Bark of kapal, (2) roots of Nagar motha.	(1) Myrica sapida, (2) Mariscus cyperinus.	...	"	0 8 0	
97	(1) Khaskas, (2) Dhaniya, (3) Poppy seeds.	(2) Coriandrum sativum.	...	"	0 8 0	
98	Taj bark	Cinnamomum Tamala,	...	"	0 12 0	
99	(1) Kapur kachri, (2) Typatta, (3) Hansraj (4) bark of Lodh.	(1) Hedychium spicatum, (2) Roylea elegans, (3) Adiantum capillusveneris and venustum.	...	Per seer ...	0 0 2	
100	(1) Bajr-bhanga, (2) roots of Akalbir.	(2) Datisca cannabina,	...	Per maund,	1 0 0	
101	Cutch	...	...	"	9 0 0	
102	Kanda and gums	...	...	"	0 6 0	
103	Ban and ropes	...	...	Per seer ...	0 0 1	3 pie for one.
104	Banslochan (a siliceous secretion in the joints of bamboos).	...	...	"	1 10 0	

APPENDIX C.

List of cattle allowed free grazing.

Name of patti.	Number.	Name of forest block.	Name of village.	No. of buffaloes.	No. of cows and bullocks.	No. of donkeys and ponies.	No. of sheep and goats.	Total.	Remarks.
KARONDAG.	1	F B. No. 3 ...	Pulinda	4	324	...	116	444	
	2	(Forests open to grazing	Syalanga	2	120	...	280	402	
	3	rights. Acres.	Tachali	2	24	...	20	46	
	4	Sattikhala ... 2,254	Gethali	4	120	...	80	204	
	5	Malan ... 2,136	*Bastali	2	104	...	24	130	
		Total ... 4,390)							
AJMERE.	1	Malan ...	Mawakot	6	464	...	8	478	
	2	Ditto ...	Kandey	4	32	...	16	52	
	3	Ditto ...	Jakhali	6	40	...	6	52	
	4	Ditto ...	Mathana	2	30	...	4	36	
	5	Ditto ...	Girula (Gwirala) ...	2	14	...	6	22	
	6	Ditto ...	Chandli	4	30	...	4	38	
	7	Ditto ...	Mathana Mulla ...	2	36	...	6	44	
	8	Ditto ...	Ditto Tulla ...	...	30	...	6	36	
	9	Ditto ...	Simalna	...	40	...	8	48	
	10	Ditto ...	Balli	...	30	...	6	36	
	11	Ditto ...	Ira Mulla	2	50	...	4	56	
	12	Ditto ...	„ Tulla	2	24	...	4	30	
	13	Ditto ...	Kotdwara	100	372	...	6	478	
	14	Ditto ...	Chaukighata ...	30	100	...	6	136	
			Total ...	174	1,984	...	610	2,768	
BICHLA UDEPTE.	1	F. B. No. 4 ...	Amola	8	482	...	310	800	
	2	(Forests open to grazing	Syalni	2	100	...	16	118	
	3	rights. Acres.	Malli Jawrasi ...	6	150	...	8	164	
		Laldhang ... 4,277)	Total ...	16	732	...	334	1,082	
TALLA UDEPTE.	1	F B. No. 5 ...	Bhawn	8	364	...	4	376	
	2	(Forests open to grazing	Kharangwar ...	8	120	...	80	208	
	3	rights. Acres.	Dilairh	2	60	...	60	122	
	4	Amgadi ... 3,135	Deoli	8	1,500	...	260	1,768	
	5	Bedasni ... 6,304	Sagwarh	2	100	...	36	138	
	6		Dhamand	2	120	...	30	152	
	7	Total ... 9,439)	Talli	...	150	...	36	186	
	8		Kathar	...	130	...	38	168	
	9		Faldakot	2	180	...	32	214	
	10	Bedasni ...	Jawkh	64	320	...	30	414	
	11	Ditto ...	Maral	6	192	...	30	228	
	12	Ditto ...	Haldogi	12	80	...	40	132	
	13	Ditto ...	Bhadsi	6	316	...	4	326	
	14	Ditto ...	Kimsar	4	162	...	28	194	
	15	Ditto ...	Banas Talla... ...	12	320	...	120	452	
	16	Ditto ...	Bhawansi	4	384	...	4	392	
	17	Ditto ...	*Amri	...	78	...	...	78	
	18	Ditto ...	*Iria	14	54	...	10	78	
	19	Ditto ...	*Jaleri	16	160	...	90	266	
	20	Ditto ...	*Kotar	34	330	...	...	364	
	21	Ditto ...	*Patna	10	92	...	...	102	
	22	Ditto ...	*Simalkhet	12	60	...	40	112	
	23	Ditto ...	Khairari	8	80	...	60	148	
	24	Ditto ...	*Kasani	4	120	...	80	204	
	25	Ditto ...	Jogiana	4	124	...	184	312	
	26	Ditto ...	*Pulyani	30	160	...	120	310	
	27	Ditto ...	*Karakot	8	80	...	40	128	
	28	Ditto ...	*Dharkat	8	600	...	200	808	
	29	Ditto ...	Khaleti	2	136	...	56	194	
BICHLA UDEPTE.	30	Ditto ...	*Kesht	16	400	...	160	576	
	31	Ditto ...	†Dhura	8	200	...	80	288	
			Total ...	314	7,172	...	1,952	9,438	
		Area of forests open to grazing right 18,106 acres.	GRAND TOTAL ...	504	9,888	...	2,896	13,288	

* Villages entered which have no place in the sanctioned record of rights.
† Village entered which, though named in the record of rights, is not entered as possessing a right of grazing.

GARHWÀL SENIOR ASST. COMMR'S, OFFICE:
February, 1884.

(Sd.) J. FISHER,
Senior Asst. Commissioner.

(*N.B.*—The areas in column 3 have been added to the original paper.)

APPENDIX D.

List of cattle on which grazing dues were paid during 1885-86.

Number.	Name of parao.	Compartments grazed over.	(Gots) number of cattle.			(Guiars) Number of cattle.		
			Cows.	Buffaloes.	Goats.	Cows.	Buffaloes.	Goats.
1	Kotdwara ...	Gewai 1 and 2	71	2	...	...	46	...
2	Kham (cultivation) ...	Malan, Gwalgarh and Gewai,	258	65	1	...	...	...
3	Sukrau	Sattikhala 1	5	68	...	1	25	...
4	Am Sot	Gwalgarh 4	1	10	...	...	...	...
5	Chaukighata ...	Malan 1	57	...	...	...	...	...
6	Chamaria	Sigadi 3	75	204	...	...	...	...
7	Jaspur	„ 5	33	83	...	...	...	...
8	Nalgadi	„ 12	23	169	...	...	...	...
9	Sigadi	„ 14	114	106	...	...	...	...
10	Naigadi	„ 20 and 21	3	3	...	...	...	...
11	Kalalghati	„ 21	...	18	...	...	...	...
12	Bhouri Sot	Rawasan 4 and 6 ...	5	73	...	9	56	...
13	Pandowala	Luni 2 and 5	6	40	...	...	28	...
14	Sainpani	„ 4 and 5	...	...	...	...	24	...
15	Luni	„ 7	73	212	...	...	...	...
16	Mithawali	„ 6, 10 and 11 ...	...	...	...	...	94	...
17	Poolawala	„ 10	6	81	...	...	...	...
18	Khara	„ 11	18	...	...	...	...	...
19	Kubari	„ 11	...	...	...	...	36	...
20	Karundawala ...	Mandal 1	...	...	...	1	19	...
21	Mundal	„ 2, 6 and 11 ...	40	92	...	...	...	...
22	Chipli	„ 2, 3 and 4 ...	...	...	...	5	28	...
23	Koluwala	„ 8	...	...	...	...	11	...
24	Baherkunda ...	„ 8, 9 and 11 ...	...	...	...	3	47	6
25	Siodhari	„ 6 and 7 ...	...	...	...	1	31	2
26	Garapani	„ 2, 6 and 11 ...	5	117	16	2	42	...
27	Kankhal	Mandal 12 and Dogadda 5 ...	152	29	...	...	...	...
28	Aulawala ...	Dogadda 1 and 2 ...	...	15	...	...	...	...
29	Ander-majhera ...	„ 5	187	28	...	...	...	...
30	Jamnia	„ 5	...	77	...	...	...	...
31	Katwala	„ 6	193	67	...	...	...	...
32	Gori	„ 7	85	1	...	...	...	...
33	Lal Sot	Kunau 1	4	53	...	4	73	20
34	Bogsawala	„ 4	1	21	...	1	20	..
35	Simal Sot	„ 3	6	27	...	12	50	...
36	Halduwala	„ 3	...	23	...	...	...	...
37	Sayar Sot	„ 3 and 4... ...	2	37	1	1	17	...
38	Phalandapani ...	„ 4 and 5... ...	4	35	...	5	34	...
39	Nagarawala ...	„ 5	...	...	128	...	...	...
40	Sidhwala	„ 5	1	18	...	...	...	...
41	Agta Sot	„ 5 and 6... ...	12	130	2	18	138	7
42	Jhatukhal	„ 5 and 6... ...	1	34	...	...	...	...
43	Kunau	„ 6	325	6	...	...	...	...
44	Ganda Bahera ...	„ 6	21	159	...	8	108	...
45	Malwala	„ 6 and 7... ...	...	...	...	3	26	...
46	Basudhara	„ 7	14	40	...	...	...	...
47	Pateeyu	Bedasni 5 and 6... ...	1	21	...	...	18	...
48	Kumbi Chaor ...	„ 6	8	30	5	8	30	...
		Total ...	1,810	2,194	153	82	1,001	35

APPENDIX E.

List of village lands (chaks) situated within the working circle.

Serial number.	Name of chak.	Area.	Length of boundary.		No. of pillars.	Compartment in which situated.	Remarks.
		Acres.	M.	C.			
1	Pulani	120·	2	0	9	Luni 3.	These chaks are all situated in block V. in pargana Ganga Salan and in patti Udepur.
2	Garkot	200·	2	10	6	Ditto.	
3	Bhawansi	154·	1	31	6	Luni 8.	
4	Kesangaon	5·	0	25	3	Amgadi 1.	
5	Kenwani Garkot ...	154·	3	25	20	Dogadda 4.	
6	Dhamad Pakhri ...	56·8	1	36	15	Bedasni 2 ...	
7	Sayar Dhamad ...	217·6	3	40	40	Ditto.	
8	Huldu Katal and Baheri Katal	66·	1	30	13	Ditto.	
9	Saudandhar ...	5·	0	40	4	Ditto.	
10	Siargadh	26·4	0	50	6	Ditto.	
11	Timal Kholi ...	9·2	0	37	4	Ditto.	
12	Kesoobari	18·	0	54	4	Ditto.	
13	Dobrana	78·4	1	75	16	Ditto.	
14	Kusmikatal... ...	6·5	0	35	3	Ditto 3.	
15	Khergasa	8·	0	29	4	Ditto.	
16	Pundras	50·	1	35	13	Ditto 4.	
17	Godanugaon ...	22·8	0	75	10	Ditto 5.	
18	Jank	213·	2	10	21	Ditto.	
19	Karakatal	2·	0	20	4	Ditto.	
20	Simaldanda	14·4	0	27	6	Ditto 6.	
21	Khairgala and Mauban ...	82·	2	0	15	Ditto.	
22	Banj-ka-khal ...	4·	0	25	4	Ditto.	
23	Dhotia	64·4	1	34	15	Ditto.	
24	Patna and Huldogi ...	488·	2	18	21	Ditto.	
25	Khairgala	23·	0	65	10	Ditto.	
26	Khairari	20·2	0	55	6	Ditto.	
27	Kunau	1,512·	4	25	25	Kunau 2 to 6.	
	Total ...	3,620·7	37	26	303		

APPENDIX F.

List of village rights.

Name of patti.	Number of forest blocks in the open portions of which these rights can be exercised.	Names of villages having rights.	Description of rights to— Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural purposes, with sanction of forest officers.	Grass for thatching.	Timber for building, with sanction of forest officers.	Green leaves.	Dry leaves.	Stone for buildings.	Slates.	Charcoal for blacksmiths.	Creepers and bark for tanning.	Fruits and roots.	Fishing.	Irrigating channels.	Water for mills.	Burning ghats.	Limestones.	Bamboos and babár.	Paths to different places.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Kurandoo.	Forest Block No. 3 ...	Pulinda	*	*	*	...	*	*	...	*	...	...	...	...	*	*	*	...	*Vide* addenda to list of rights G. O. No. 356 of 22nd May, 1882.	...	...	...	*	
	Ditto ...	Sialanga	*	*	*	...	*	*	...	*	...	...	...	...	*	*	*	...		...	...	*	*	
	Ditto ...	Tachali	*	*	*	...	*	*	...	*	...	...	...	...	*	*	*	...		...	...	*	*	
	Ditto ...	Gethali	*	*	*	...	*	*	...	*	...	...	...	...	*	*	*	...		...	...	*	*	
Ajmere.	Ditto ...	Mawakot	*	*	*	...	*	*	*	...	...	*	...	...	*	*	...	...		*	...	...	*	
	Ditto ...	Kandi and Jakhoti	*	*	*	...	*	...	...	...	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Mathana Bichla	*	...	...	...	*	...	...	*	*	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Simalna	...	...	...	...	*	*	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Gwerali	*	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Chendli	*	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Mathana Malla	*	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Ditto Talla	*	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Utiacha	...	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	*	
	Ditto ...	Simalna Talla	*	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Bali	*	...	...	...	*	*	...	*	...	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Ira Malla	*	*	*	...	*	*	*	*	*	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Ira Talla	*	*	*	...	*	*	*	*	*	...	...	...	*	*	...	...		...	...	...	...	
	Ditto ...	Kotdwara†	*	*	*	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	
	Ditto ...	Chaukighata†	*	*	*	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	
Bichla Udepur.	Forest Block No. 4 ...	Kachunda	...	...	...	...	*	*	...	*	...	...	*	...	*	...	...	...		...	...	...	...	
	Ditto ...	Debran	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	
	Ditto ...	Amola	*	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Syalni	*	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Jorasi Talli	...	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Kest	...	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Ghura	...	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Kande	...	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Jorasi Malli	*	...	...	...	*	*	...	*	...	...	*	...	*	*	...	...		...	...	...	...	
	Ditto ...	Kandi	...	...	...	...	*	*	..	*	...	...	*	...	*	*	...	...		*	...	...	...	
	Ditto ...	Dhunga Akra	...	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		*	...	...	...	
	Ditto ...	Ditto Shaká	...	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		*	...	...	...	
	Ditto ...	Bethani	...	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		*	...	...	...	
	Ditto ...	Bharet	...	...	...	...	*	...	...	*	...	...	...	...	*	*	...	...		*	...	...	...	

† The hill people have the right of taking up baskets, sieves, mats and such like petty articles manufactured at Kotdwara for their own use free of duty (this remark applies only to Kotdwara and Chaukighata).

APPENDIX F.

List of village rights—(concluded).

Name of patti.	Number of forest blocks in the open portions of which these rights can be exercised.	Names of villages having rights.	Description of rights to— Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officers.	Grass for thatching.	Timber for building, with sanction of forest officers.	Green leaves.	Dry leaves.	Stone for buildings.	Slates.	Charcoal for blacksmiths, with sanction of forest officers.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghats.	Limestone.	Bamboos and lather.	Paths to different places.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Talla Udepur.	Forest Block, No. 5 ...	Bhon	*	*	*	...	*	*	*	*	*	...	...	...	*	*	...	...		*	...	*	*	
	Ditto ...	Kharangwas	*	*	*	...	*	*	*	*	*	...	...	...	*	*	...	...		*	...	*	*	
	Ditto ...	Dilair	*	*	*	...	*	*	...	...	...	...	...	...	*	...	...	...			...	*	...	
	Ditto ...	Deoli	*	*	*	...	*	*	*	*	...	...	*	...	*	*	...	...		*	...	*	*	
	Ditto ...	Syar and Dhamand	*	*	*	...	*	*	*	*	...	...	*	...	*	...	...	...		*	...	*	*	
	Ditto ...	Toli	*	*	*	...	*	*	*	*	...	...	...	...	*	...	...	...		*	...	*	*	
	Ditto ...	Kothar	*	*	*	...	*	*	*	*	...	...	...	...	*	...	...	...		*	...	*	*	
	Ditto ...	Fuldakot	*	*	*	...	*	*	*	*	...	...	*	...	*	...	...	...		*	...	*	*	
	Ditto ...	Jawk	*		...	...	*	*	*	*	...	...	...	...	*	...	...	...		*	...	*	*	
	Ditto ...	Marál	*	*		...	*	*	*	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Haldogi	*	*	*	...	*	*	*	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Patua	...	...		...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Bhadsi	*	*	*	...	*	...	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Dharkot	...	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Kimsar	*	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Banas Mulla	...	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Kesani	...	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Ramjani	...	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Banas Talla	*	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	
	Ditto ...	Bhawansi	*	...	...	...	*	*	...	*	...	...	...	...	*	...	...	...		*	...	*	...	

N.B.—The asterisk* shows that the village has a right to the forest article in the column in which it is recorded.

A.—*Firewood from fallen wood.*—If in any case there is no fallen wood available, the Forest Department must arrange for a supply.
B.—*Timber for building*—The maximum size for a house for building and maintaining which timber can be claimed is 40′ (forty feet) × 36′ (thirty-six feet) × 16′ (sixteen feet).
C.—*Green leaves.*—Any trees may be lopped for green leaves, except the following protected kinds; but the lopping is limited to branches not exceeding 2 inches in diameter:—

Sál, Shorea robusta.
Sain, Terminalia tomentosa.
Shisam, Dalbergia Sissoo.
Tun, Cedrela Toona.
Huldu, Adina cordifolia.
Jaman, Eugenia jambolana.
Sandan, Ougeinia dalbergioides.
Bijasál, Pterocarpus marsupium.
Bargat, Ficus bengalensis.
Pipal, „ religiosa.
Dhaura, Lagerstrœmia parviflora.
Bakli, Anogeissus latifolia.
Gosham, Schleichera trijuga.
Khair, Acacia catechu.
Tendu, Diospyros melanoxylon.
Ranni, Mallotus phillipinensis.
Amaltas, Cassia fistula.
Simal, Bombax malabaricum.
Bhillaur, Trewia nudiflora.
Gainti Boehmeria ruguloss.
Khabar, Ficus cordifolia.
Pákar „ sp.
Pilkhan „ injectoria.
Bans, Bamboos.

D.—With the sole exception of the right "Fodder grass for sale" these rights are limited to the actual domestic and agricultural requirements of the villagers for whom they are recorded, and they cannot be exercised in any way for purposes of trade.

ADDENDA TO LIST OF RIGHTS, GANGES DIVISION.

List of villages entitled to water for mills.

Number.	Locality.	Name of village.	Name of patti.	Remarks.
1	Bedasni	Timli	Malla Udepur ...	*Vide* G. O. No. 356, dated 22nd May, 1882.
2	Ditto	Bhogpur	Talla Udepur ...	
3	Tal	Khairana	Ditto ...	
4	Bhaunri	Amola	Bichla Udepur ...	
5	Laldhang... ...	Kandi	Ditto ...	
6	Ditto	Airoli	Ditto ...	
7	Ditto	Jahori	Ditto ...	
8	Ditto	Dhaunri	Dhauga ...	
9	Bijianagar ...	Phauchur	Bichla Udepur ...	
10	Ditto	Aivo	Ditto ...	
11	Jamansot... ...	Badoli	Ditto ...	
12	Kilwali	Jathri	Ditto ...	
13	Lunisot	Gadi	Ditto ...	
14	Murdarisot ...	Naugaun	Talla Udepur ...	

GARHWÁL;
SENIOR ASSISTANT COMMISSIONER'S OFFICE.
The 11th March, 1882.

J. FISHER,
Senior Assistant Commissioner.

APPENDIX G.

List of Rates for Timber for 1884-85.

Length in feet.	Girth in inches.	Rates per cubic foot.
	Sál timber dry (unbarked).	Rs. a. p.
From 1′ to 5′	From 25″ to 30″	0 4 0
„ 6′ to 45′	„ 25″ to 30″	0 5 0
„ 1′ to 5′	„ 31″ to 36″	0 5 0
„ 6′ to 45′	„ 31″ to 36″	0 6 0
„ 1′ to 5′	„ 37″ to 42″	0 6 0
„ 1′ to 5′	„ 43″ to 54″	0 7 0
„ 6′ to 45′	„ 37″ to 42″	0 8 0
„ 1′ to 5′	„ 55″ to 100″	0 8 0
„ 6′ to 45′	„ 43″ to 54″	0 9 0
„ 6′ to 45′	„ 55″ to 100″	0 10 0
	Sál timber dry (barked).	
From 1′ to 5′	From 8″ to 12″	0 4 0
„ 1′ to 5′	„ 13″ to 18″	0 4 6
„ 6′ to 45′	„ 8′to 12″	0 5 0
„ 1′ to 5′	„ 19″ to 30″	0 6 0
„ 6′ to 15′	„ 13″ to 18″	0 6 0
„ 1′ to 5′	„ 31″ to 36″	0 7 0
„ 6′ to 15′	„ 19″ to 24″	0 7 0
„ 16′ to 45′	„ 13″ to 18″	0 7 0
„ 1′ to 5′	„ 37″ to 54″	0 8 0
„ 6′ to 15′	„ 25″ to 30″	0 8 0
„ 16′ to 45′	„ 19″ to 24″	0 8 0
„ 1′ to 5′	„ 55″ to 60″	0 9 0
„ 6′ to 15′	„ 31″ to 36″	0 9 0
„ 16′ to 45′	„ 25″ to 30″	0 9 0
„ 6′ to 15′	„ 37″ to 42″	0 9 6
„ 6′ to 15′	„ 43″ to 48″	0 10 0
„ 16′ to 45′	„ 31″ to 36″	0 10 0
„ 6′ to 15′	„ 49″ to 54″	0 10 6
„ 16′ to 45′	„ 37″ to 42″	0 10 6
„ 6′ to 15′	„ 55″ to 60″	0 11 0
„ 16′ to 45′	„ 43″ to 48″	0 11 0
„ 1′ to 45′	„ 61″ to 120″	0 12 0
„ 16′ to 45′	„ 49″ to 120″	0 12 0
Dry Sandan timber	...	0 5 0
„ Shisham „	...	0 5 0
„ Tun „	...	0 5 0
„ Sain „	...	0 3 0
„ Kokat „	...	0 2 0

Ballis of all sorts of Timber.

Girth at the thickest end in inches—	Rs. a. p.
From 1″ to 6″	0 0 1
„ 7″ to 9″	0 0 3
„ 10″ to 12″	0 0 9
„ 13″ to 15″	0 0 6
„ 16″ to 18″	0 3 0
„ 19″ to 21″	0 5 0
„ 22″ to 24″	0 8 0
„ 25″	0 9 0
„ 26″	0 10 3
„ 27″	0 12 0
„ 28″	0 14 6
„ 29″	1 0 6
„ 30″	1 3 0

APPENDIX H.

Abstract of revenue realized on different kinds of forest produce through Kham Chaukis during the year, 1884-85.

No.	Name of chauki.	*Timber.* Quantity.	*Timber.* Amount.	*Firewood.* Amount.	*Bamboos.* Quantity.	*Bamboos.* Amount.	*Grazing dues and fodder grass.* Amount.	*Minor produce.* Amount.	*Total.* Amount.
		No.	Rs. a. p.	Rs. a. p.	No.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Kauria and Kotdwara ...	7,347	1,304 7 5	2 2 0	313,385	1,159 1 7	0 3 0	987 1 7	3,452 15 7
2	Haldukhata	214	99 8 4	15 6 3	48,060	197 14 1	10 14 3	202 9 7	526 4 6
3	Papidanda	546	105 13 0	21 14 0	913,968	2,912 5 1	4 3 6	49 3 1	3,093 6 8
4	Laldhang	1,938	925 13 8	9 9 0	1,646,053	5,617 4 2	191 11 3	151 5 6	6,895 11 7
5	Peli	5,685	436 14 9	22 7 3	1,436,271	4,881 14 11	103 10 3	217 8 11	5,662 8 1
6	Chila	2,297	761 1 5	452 10 4	868,020	3,915 12 8	4 9 3	63 9 4	5,197 11 0
7	Gori	5,411	2,623 1 5	440 14 9	1,488,426	6,704 9 6	9 3 6	80 9 11	9,858 7 1
8	Lachmanjhula	...	...	...	...	...	0 12 0	60 7 0	61 3 0
	Total ...	23,438	6,256 12 0	964 15 7	6,714,183	25,388 14 0	325 3 0	1,812 6 11	34,748 3 6

Remarks.

Minor produce.			Rs.
Skins	No. 6,513	...	971
Honey	Mds. 40	...	61
Kanda	„ 1,109	...	348
Stones	c. ft. 952	...	68
Horns	No. 1,130	...	27
Wax	1 md 1 seer	...	6
Bark of lodh	Mds. 147	...	61
Harr	„ 60	...	80
Pula grass	„ 1,534	...	38
Ropes	„ 98	...	20
Miscellaneous	...	...	1,105
	Total	...	2,785

No.	Name of chauki.	Sal tors, &c.	Sandan tors, &c.	Shisham tors, &c.	Tun golas.	*Sain.* Tors, &c.	*Sain.* Karris.	*Kokat.* Tors, &c.	*Kokat.* Karris.	Ballis or poles of all descriptions.	Khair.	Total.
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1	Kauria and Kotdwara...	3,337	68	1	2	2,555	...	1,359	...	5	...	7,347
2	Haldukhata	149	17	4	...	18	...	6	...	18	2	214
3	Papidanda	240	9	20	..	21	...	247	...	9	...	546
4	Laldhang	354	147	413	...	265	...	84	...	658	17	1,938
5	Peli	100	27	15	...	15	...	8	...	5,463	57	5,685
6	Chila	1,062	16	11	...	58	...	45	...	1,103	2	2,297
7	Gori	231	510	130	7	686	2,240	974	4	620	9	5,411
8	Lachmanjhula	...	...	...	...	...	..	...	...	...	...	...
	Total ...	5,473	794	594	9	3,618	2,240	2,723	4	7,876	87	23,438

APPENDIX J.

Table of contents of compartments.

UDEPUR RANGE.

Block.	No. of compartments.	Area in acres included in valuation.	No. of acres actually valued.	Sal.								Sain.								Haldu.							
				Class IV.	Class III.		Class II.		Class I.		Total.	Class IV.	Class III.		Class II.		Class I.		Total.	Class IV.	Class III.		Class II.		Class I.		Total.
					Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
I.—Gewai ...	1	707	63	8,739	1,930	69	375	55	144	60	11,372	290	252	...	109	...	270	22	943	139	123	71	57	43	121	168	722
	2	540	52	13,311	4,019	205	817	197	332	92	18,973	1,459	1,236	...	528	13	269	...	3,505	247	75	114	12	84	12	100	644
	3	403	38	9,553	3,679	159	435	42	116	42	14,026	1,251	912	11	329	42	255	62	2,862	32	42	11	42	32	32	22	213
Total ...	...	1,650	153	31,603	9,628	433	1,627	294	592	194	44,371	3,000	2,400	11	966	55	794	84	7,310	418	240	196	111	159	165	290	1,579
II.—Sukrau	1	470	50	9,714	4,004	205	543	133	205	119	14,923	23	...	...	...	...	11	...	34	82	81	11	15	11	11	...	211
	2	574	50	16,706	4,253	480	609	555	221	211	23,035	23	15	...	7	7	38	...	90	7	28	...	14	35	35	93	212
Total ...	...	1,044	100	26,420	8,257	685	1,152	688	426	330	37,958	46	15	...	7	7	49	...	124	89	109	11	29	46	46	93	423
III.—Sattikhala...	1	682	44	4,010	1,035	54	198	59	...	...	5,356	943	1,810	59	1,151	...	739	93	4,795	99	231	148	49	129	40	150	846
	2	688	43	6,765	2,651	37	126	74	74	...	9,707	2,199	1,081	148	590	37	362	37	4,454	249	249	62	161	62	187	364	1,334
	3	513	47	14,110	3,854	156	200	97	125	44	18,586	1,464	1,238	33	332	...	333	10	3,410	256	92	69	20	10	40	48	535
Total ...		1,883	134	24,885	7,520	247	524	230	199	44	33,649	4,606	4,129	240	2,073	37	1,434	140	12,659	604	572	279	230	201	267	562	2,715
IV.—Gwalgarh...	1	458	53	3,374	1,107	62	274	32	73	39	4,961	958	640	15	321	18	113	13	2,078	100	106	40	105	58	36	136	581
	2	535	41	5,387	1,551	166	269	84	76	54	7,587	1,345	893	...	294	33	149	22	2,736	175	215	44	91	58	113	143	839
	3	428	77	12,346	2,215	194	373	162	114	136	15,540	170	123	4	60	16	86	4	463	92	66	48	40	42	40	80	408
	4	674	61	25,170	4,802	296	570	156	180	70	31,244	5,996	1,100	16	180	...	100	10	7,402	210	90	50	50	10	70	70	550
	5	496	24	7,607	1,854	39	182	...	91	13	9,786	6,115	2,628	83	681	12	363	53	9,935	277	236	30	30	30	...	30	633
Total ...	...	2,591	256	53,884	11,529	757	1,668	434	534	312	69,118	14,584	5,384	118	1,536	79	811	102	22,614	854	713	212	316	198	259	459	3,011

V.—Mahan ...	1	1,018	103	21,926	4,089	73	709	...	110	29	26,936	4,006	885	44	290	...	231	22	5,478	616	490	299	261	157	255	504	2,582
	2	850	23	6,982	1,488	171	171	57	171	171	9,211	7,805	3,655	225	813	140	656	83	13,377	182	208	114	...	...	...	...	504
Total ...	...	1,863	126	28,908	5,577	244	880	57	281	200	36,147	11,811	4,540	269	1,103	140	887	105	18,855	798	698	413	261	157	255	504	3,086
VI.—Sigadi ...	1	516	23	998	216	42	44	20	...	...	1,320	66	...	22	..	...	...	...	88	66	264	...	...	...	...	44	374
	2	630	40	3,364	365	19	32	12	6	...	3,798	110	51	...	18	...	6	6	191	50	106	...	44	...	...	...	200
	3	458	21	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	105	84	...	84	21	21	63	378
	4	532	30		...	...	...	...	...	...	...	...	...	...	...	...	...	.	...	...	...	...	17	...	18	...	35
	5	529	25	3,696	561	73	24	36	48	61	4,499	...	...	...	...	...	...	...	...	...	...	24	.	...	...	...	24
	6	894	29	4,344	916	48	97	48	...	16	5,469	101	48	...	69	...	...	...	218	...	32	...	16	...	53	...	101
	7	864	38	12,634	1,648	88	415	89	58	75	15,007	133	161	...	73	...	...	...	367	14	...	...	...	...	...	63	77
	8	340	30	16,294	1,695	56	203	90	33	56	18,427	2,282	350	56	146	33	113	33	3,013	...	...	...	...	...	...	...	...
	9	495	25	24,099	2,193	236	213	190	19	57	27,007	3,754	808	57	270	61	65	38	5,053	...	...	.	...	...	...	...	...
	10	866	28	29,102	3,248	351	905	157	142	60	33,965	4,471	800	60	330	30	30	15	5,742	...	...	...	...	...	...	...	...
	11	1,060	49	18,501	1,814	148	395	231	25	49	21,163	385	237	...	122	...	24	...	768	109	49	24	73	...	...	...	255
	12	1,465	68	9,374	1,484	79	417	22	46	19	11,441	534	111	...	68	...	15	...	728	100	72	...	...	...	48	...	220
	13	608	14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	
	14	1,150	55	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	314	201	...	44	...	112	45	716
	15	584	50	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	...	10
	16	749	65	8,323	977	88	95	36	43	...	9,562	508	387	26	176	...	71	...	1,168	26	26	...	...	...	17	...	69
	17	352	32	3,061	1,093	164	85	18	33	44	4,498	2,774	455	12	84	...	68	11	3,404	105	187	...	37	14	22	...	365
	18	166	24	3,059	389	22	13	10	8	...	3,501	417	331	...	82	...	60	...	890	16	24	8	8	8	...	...	64
	19	958	53	9,177	2,352	104	65	17	44	17	11,776	1,176	612	...	187	...	275	...	2,250	43	60	26	22	...	21	...	172
	20	1,128	68	12,051	2,737	170	407	100	70	70	15,605	310	141	...	20	...	..	...	471	701	702	64	266	31	117	185	2,066
	21	617	89	9,838	3,153	159	158	41	17	51	13,417	2,696	1,237	29	257	6	78	35	4,308	851	574	171	94	160	31	280	2,161
	22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...
Total ...	...	14,961	856	1,67,915	24,841	1,847	3,568	1,117	592	575	2,00,455	19,717	5,699	262	1,908	130	805	138	28,659	2,500	2,381	317	705	234	470	680	7,287
VII.—Laldhang ...	1	342	22	3,130	1,581	109	237	45	57	11	5,170	1,110	810	11	318	...	197	..	2,446	193	173	11	25	...	..	...	402
	2	190	7	1,070	340	20	20	20	10	...	1,480	1,640	1,080	20	660	10	250	60	3,720	100	100	...	..	...	...	...	200
	3	384	48	3,900	2,291	136	381	122	82	82	6,994	1,478	1,011	45	370	34	199	20	3,157	31	...	...	...	...	...	11	42
	4	610	18	12,452	2,849	240	329	200	200	85	16,355	5,426	1,759	58	633	18	259	36	8,189	49	49	...	40	..	...	...	138
	5	800	43	8,074	1,735	286	194	176	268	206	10,939	5,072	3,040	58	650	142	1,464	28	10,454	335	389	15	101	56	112	43	1,051
Total ...	...	2,326	138	28,626	8,796	791	1,161	563	617	384	40,938	14,726	7,700	192	2,631	204	2,369	144	27,966	708	711	26	166	56	112	54	1,833
VIII.—Rawasan ...	1	500	22	11,782	1,736	131	311	73	73	55	14,161	2,943	454	25	131	.	18	18	3,589	18	37	...	18	...	...	...	73
	2	670	37	15,728	1,796	180	316	180	112	60	18,372	112	100	...	100	...	100	...	412	16	...	...	...	...	...	16	32
	3	881	36	10,375	3,094	208	309	216	118	34	14,354	12,108	2,423	173	931	34	271	71	16,011	269	166	65	139	81	...	71	791
	4	553	32	8,058	1,960	346	342	57	..	21	10,784	2,347	857	21	207	21	201	...	3,654	122	45	40	15	...	...	...	222
	5	875	36	7,291	1,989	371	308	112	25	25	10,121	4,185	3,460	137	1,749	146	523	82	10,282	313	162	185	91	189	25	16	981
	6	983	47	19,778	2,541	516	687	314	280	109	24,225	3,402	1,439	63	789	...	885	63	6,641	285	23	40	60	...	20	...	428
	7	550	24	5,670	1,134	162	108	27	...	...	7,101	...	...	...	...	...	...	...	...	90	21	27	...	...	...	...	138
Total ...	...	5,012	234	78,682	14,250	1,914	2,381	979	608	304	99,118	25,097	8,733	419	3,907	201	1,998	234	40,589	1,113	454	357	322	270	45	103	2,665

APPENDIX J.

Table of contents of compartments—(concluded).

GORI RANGE.

Block.	Number of compartments.	Area in acres included in valuation.	Number of acres actually valued.	Sál.								Sain.								Haldu.							
				Class IV.	Class III.		Class II.		Class I.		Total.	Class IV.	Class III.		Class II.		Class I.		Total.	Class IV.	Class III.		Class II.		Class I.		Total.
					Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
IX.—Luni ...	1	766	27	15,566	2,990	482	441	133	171	50	19,833	2,543	1,441	...	429	66	383	93	4,955	213	33	60	...	...	..	...	306
	2	725	18	18,084	1,843	252	288	269	142	72	20,950	646	951	36	684	72	322	89	2,800	89	106	106	...	...	53	53	407
	3	1,170	35	14,167	3,792	615	444	129	48	...	19,195	7,570	5,091	920	1,479	68	949	52	16,129	90	...	..	75	5	...	...	170
	4	1,110	82	13,458	1,388	129	931	101	225	102	16,334	250	359	11	267	11	149	22	1,069	110	63	16	...	69	4	50	312
	5	1,692	90	4,453	776	35	102	10	25	...	5,401	175	86	...	4	...	...	...	265	377	460	206	25	98	73	...	1,239
	6	1,258	265	5,073	2,493	144	535	91	113	38	8,492	41	6	...	3	...	3	...	53	59	5	1	49	2	..	18	134
	7	687	30	680	149	...	...		21	21	871	210	95	...	63	...	74	21	463	105	63	...	42	...	...	42	252
	8	427	39	6,816	1,336	221	215	162	21	34	8,805	1,925	503	45	244	66	64	21	2,868	24	...	...	15	...	...	...	39
	9	1,030	47	7,106	1,940	236	224	216	274	189	10,185	619	227	16	133	54	155	32	1,236	80	80	16	128	.	64	...	368
	10	862	42	4,999	1,829	250	417	100	57	154	7,806	843	31	...	26	...	22	26	948	27	...	...	...	35	...	...	62
	11	1,660	74	3,491	245	409	78	111	38	32	4,404	1,340	127	56	13	...	5	18	1,559	...	...	...	...	...	...	...	...
Total ...	...	11,387	749	93,898	18,781	2,773	3,674	1,322	1,135	692	1,22,276	16,162	8,917	1,084	3,345	337	2,126	374	32,345	1,174	810	405	334	209	194	163	3,289
X.—Amgadi ...	1	860	36	14,844	7,506	352	788	136	12	36	23,674	6,876	3,771	113	1,572	33	716	73	13,154	93	...	...	...	...	...	...	93
	2	680	50	3,591	2,207	54	593	202	160	93	6,900	3,137	2,467	41	956	13	488	13	7,115	384	75	..	40	.	13	30	542
	3	380	30	5,064	1,368	84	112	84	56	35	6,803	1,555	686	14	262	45	114	83	2,759	264	120	48	72	24	...	24	552
Total ..	...	1,920	116	23,499	11,081	490	1,493	422	228	164	37,377	11,568	6,924	168	2,790	91	1,318	169	23,028	741	195	48	112	24	13	54	1,187
XI.—Manda'	1	930	11	4,594	2,512	342	364	258	48	196	8,314	1,666	1,160	10	368		110	38	3,352	230	50	...	10	98	...	10	398
	2	580	38	142	33	6	...	...	...	5	186	779	540		136	33	66	17	1,571	...	...	...	...	. .	...	...	...
	3	935	47	12,415	1,097	583	61	112	51	172	14,491	5,387	1,353	145	182	60	14	36	7,177	13	...	.	...	...	...	.	13
	4	1,178	45	8,777	1,634	394	426	313	82	157	11,783	120	10	...	53	...	40	...	223	...	...	...	...	...	...	38	38
	5	932	26	667	281	100	28	24	..	41	1,141	112	66	..	60	...	14	...	252	...	...	...	...	...	...	...	...
	6	1,022	30	783	170	34	170	...	204	102	1,463	307	170	...	136	...	34	...	647	...	...	...	...	...	...	...	..
	7	856	37	7,576	1,562	393	400	116	70	70	10,187	671	475	...	180	...	29	...	1,355	314	331	116	231	41	29	58	1,120
	8	600	44	164	...	...	...	25	...	...	189	277	38	...	25	...	...	...	340	...	...	...	...	...	...	...	...

	9	638	29	4,180	846	1,054	61	206	43	153	6,543	934	184	15	108	14	24	24	1,308	...	...	...	...	...	...	...	...
	10	766	50	6,686	1,178	602	233	251	...	117	9,067	230	121	3	64	...	49	19	486	...	26	...	...	...	...	...	26
	11	584 (Sish'am)	564	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	12	402	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	8,723	921	45,984	9,313	3,508	1,743	1,305	498	1,013	63,364	10,483	4,117	173	1,312	107	380	134	16,706	557	407	116	241	139	29	106	1,595
XII.—Jogi Chaur,	1	788	80	9,833	1,671	196	976	244	505	256	13,681	735	300	...	16	...	109	...	1,160	...	...	...	...	...	...	...	...
XIII.—Ander-Majhera.	1	739	45	8,244	2,112	31	288	61	90	46	10,872	61	61	...	15	...	...	16	153	15	14	...	...	...	...	31	60
	2	570	40	12,335	1,527	259	357	425	237	425	15,565	213	198	...	90	...	90	...	591	36	...	36	...	...		...	72
Total ...	...	1,309	85	20,579	3,639	290	645	486	327	471	26,437	274	259	...	105	...	90	16	744	51	14	36	...	...	...	31	132
XIV.—Dogadda ...	1	770	30	3,157	2,255	132	308	44	44	22	5,962	3,377	1,375	22	770	55	451	88	6,138	187	77	22	33	11	22	33	385
	2	965	81	11,322	1,447	252	503	169	223	119	14,035	663	200	19	190	...	88	12	1,172	25	63	6	19	...	6	...	119
	3	798	40	4,537	1,604	449	323	209	16	77	7,215	386	138	...	172	27	27	27	777	16	...	...	...	16	...	.	32
	4	733	40	663	272	34	119	...	...	...	1,088	306	221	...	170	...	102	...	799	221	136	51	187	17	68	141	821
	5	1,192	1,750	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	..	...	...	14	17
	6	759	1,184	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9	9
	7	963	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4
Total ...	...	6,180	3,125	19,679	5,578	867	1,253	422	283	218	28,300	4,732	1,934	41	1,302	82	668	127	8,886	452	276	79	239	44	96	201	1,387
XV.—Kauria Chaur.	1	1,085	53	3,825	328	22	130	34	4	93	4,436	4	...	...	...	...	...	...	4	99	4	4	71	...	...	66	244
	2	870	40	48,730	4,293	227	478	46	139	310	54,223	...	...	...	...	...	...	...	...	23	...	..	46	...	...	70	139
Total ...	...	1,955	93	52,555	4,621	249	608	80	143	403	58,659	4	...	...	...	...	...	...	4	122	4	4	117	...	...	136	383
XVI.—Bedasni ...	1	940	50	86	89	...	28	...	...	...	203	186	278	15	76	40	160	15	776	451	216	92	223	96	150	522	1,750
	2	615	40	5,356	156	13	13	...	...	13	5,551	825	745	...	212	...	148	13	1,943	772	294	122	32	189	...	116	1,525
	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	..	...
	5	1,375	42	...	...	...	...	...	...	...	...	...	...	53	106	...	53	...	212	1,528	836	91	452	125	289	159	3,480
	6	1,270	50	...	...	...	...	...	...	...	...	2,644	1,465	47	780	66	521	20	5,543	106	53	27	81	27	27	26	347
Total ...	...	4.200	182	5,442	245	13	41	...	...	13	5,754	3,655	2,488	115	1,174	112	882	48	8,474	2,857	1,399	332	788	437	466	823	7,102
XVII.—Kunau ...	1	886	39	529	357	61	41	21	20	...	1,029	218	139	...	76	...	58	...	491	195	58	..	107	...	41	119	520
	2	319	29	121	55	...	11	...	11	11	209	...	...	...	...	...	...	...	...	33	...	...	...	...	...	...	33
	3	1,190	50	2,410	1,649	72	221	47	167	133	4,699	211	176	...	66	..	44	...	497	493	135	...	69	...	56	...	753
	4	1,370	80	3,592	620	99	116	47	32	33	4,539	333	467	...	271	36	294	...	1,401	31	42	7	144	...	169	36	420
	5	1,430	68	1,701	756	126	168	126	21	63	2,961	672	252	...	63	...	21	...	1,008	...	42	...	...	...	21	21	84
	6	974	40	1,637	589	54	75	53	10	21	2,439	168	...	...	32	...	21	...	221	342	38	...	.	...	76	...	456
	7	1,579	105	5,359	2,058	291	487	322	107	159	8,783	251	378	...	152	...	80	8	869	400	274	28	90	37	14	137	978
Total ...	...	7,748	391	15,349	6,084	703	1,119	616	368	420	24,659	1,853	1,412	...	660	36	518	8	4,487	1,494	589	33	410	37	368	313	3,244

APPENDIX J(3).

Table of contents of Compartments—(continued).

UDEPUR RANGE.

Block.	Number of compartment.	Bakli.								Dhaura.								Gosam.							
		IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
I.—Gewai	1	527	436	20	198	25	162	55	1,423	702	370	37	109	12	25	25	1,280	1,578	374	132	73	12	...	48	2,217
	2	794	400	161	169	59	...	53	1,636	848	297	46	55	9	119	...	1,374	629	125	49	35	9	...	18	865
	3	283	35	24	82	12	...	...	436	361	53	11	11	22	...	...	458	233	11	...	...	...	10	...	254
Total ...	...	1,604	871	205	449	96	162	108	3,495	1,911	720	94	175	48	144	25	3,112	2,440	510	181	108	21	10	66	3,336
II.—Sukrau	1	628	24	11	11	...	...	14	688	1,045	378	28	28	...	7	3	1,489	92	4	11	3	...	...	...	110
	2	...	...	...	...	14	...	...	14	693	177	...	7	...	...	...	877	247	61	7	15	7	...	...	337
Total ...	...	628	24	11	11	14	...	14	702	1,738	555	28	35	...	7	3	2,366	339	65	18	18	7	...	...	447
III.—Satti Khala	1	948	266	182	393	218	34	29	2,070	522	203	...	102	7	36	...	870	521	136	125	7	...	7	...	796
	2	662	265	31	109	...	140	31	1,238	2,358	996	146	458	120	280	142	4,500	998	202	100	62	...	15	...	1,377
	3	3,235	679	101	132	11	18	11	4,187	2,293	432	24	...	...	...	...	2,749	81	24	...	...	...	...	...	105
Total ...	...	4,845	1,210	314	634	229	192	71	7,495	5,173	1,631	170	560	127	316	142	8,119	1,600	362	225	69	...	22	...	2,278
IV.—Gwalgarh	1	626	492	46	179	59	32	23	1,457	1,195	518	33	145	52	57	122	2,122	654	116	13	7	...	...	...	790
	2	1,078	491	96	279	...	128	14	2,086	1,453	542	...	74	11	22	11	2,113	808	173	72	...	..	...	...	1,053
	3	190	194	25	64	43	122	42	680	541	173	28	62	31	31	6	872	319	114	18	16	10	...	4	481
	4	762	334	84	302	120	104	62	1,768	736	140	10	40	10	...	10	946	192	36	10	10	10	...	...	258
	5	2,016	258	60	67	10	10	20	2,441	1,069	465	79	90	...	...	23	1,726	179	53	...	...	...	...	...	232
Total ...	...	4,672	1,769	311	891	232	396	161	8,432	4,994	1,838	150	411	104	110	172	7,779	2,152	492	113	33	20	...	4	2,814

V.—Malan	...	..	1	1,298	203	44	36	9	9	...	1,599	3,769	937	317	242	85	72	71	5,493	788	85	9	18	18	...	...	918
			2	6,460	732	389	135	...	...	...	7,716	33	...	...	...	...	...	...	33	...	...	...	...	...	...	...	...
	Total	...	...	7,758	935	433	171	9	9	...	9,315	3,802	937	317	242	85	72	71	5,526	788	85	9	18	18	...	...	918
VI.—Sigadi	...	...	1	1,658	770	154	132	66	44	66	2,890	152	...	...	...	...	...	...	152	...	22	22	22	...	...	...	66
			2	269	325	6	175	50	50	100	975	1,305	322	12	121	69	113	63	2,005	50	25	...	...	25	...	...	100
			3	252	189	84	63	...	...	...	588	126	21	...	21	42	21	...	231	...	...	...	...	...	...	...	...
			4	53	18	...	...	...	...	...	71	89	...	...	...	...	18	...	107	...	...	...	...	...	...	...	...
			5	36	36	...	72	...	...	24	168	304	97	36	61	12	...	12	522	...	...	...	...	...	...	...	...
			6	351	363	106	679	53	266	53	1,871	864	53	...	53	53	...	...	1,023	426	53	...	53	...	...	...	532
			7	279	220	14	14	14	...	14	555	647	148	14	172	...	14	31	1,026	...	...	..	...	...	...	...	...
			8	1,096	90	22	22	...	...	...	1,230	542	192	...	56	...	11	...	801	...	11	11	...	...	...	...	22
			9	1,584	493	19	103	...	...	...	2,199	304	...	...	...	...	...	...	304	...	...	...	...	...	...	...	...
			10	1,237	164	408	67	...	...	...	1,870	1,441	180	...	90	...	15	...	1,726	...	...	...	...	...	...	...	...
			11	904	543	48	242	74	99	10	1,920	1,173	665	41	444	24	35	172	2,554	276	112	...	35	17	...	17	457
			12	3,131	706	35	256	27	292	...	4,447	1,230	201	24	47	24	72	...	1,598	234	345	115	139	...	15	...	948
			13	148	50	...	...	...	...	...	198	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			14	112	45	...	22	...	...	22	201	157	...	22	...	22	...	...	201	22	22	...	23	...	...	...	67
			15	53	11	...	...	...	42	21	127	32	...	...	...	...	10	...	42	...	...	...	...	...	10	11	21
			16	563	261	61	87	35	25	...	1,032	382	86	...	44	...	...	...	512	19	33	8	8	...	8	2	78
			17	686	289	15	37	...	11	...	1,038	571	233	21	89	44	67	...	1,025	399	50	21	14	...	7	...	491
			18	97	72	...	21	...	8	...	198	77	16	8	...	...	...	...	101	96	...	8	...	...	...	...	104
			19	1,582	478	83	254	12	199	30	2,638	1,311	100	...	...	...	...	...	1,411	284	223	45	83	...	53	...	688
			20	1,622	1,484	196	724	109	275	285	4,695	2,691	1,717	195	814	111	37	37	5,602	845	284	99	47	22	47	11	1,355
			21	1,567	815	99	130	108	87	36	2,842	473	35	...	32	6	...	...	546	285	29	17	16	4	...	4	355
			22										Not va	lued.													
	Total	...	...	17,280	7,422	1,344	3,100	548	1,398	661	31,753	13,871	4,066	373	2,044	407	413	315	21,489	2,936	1,209	346	440	68	240	45	5,284
VII.—Laldhang	...	...	1	23	25	...	...	...	...	...	48	86	...	...	...	...	...	...	86	...	...	...	...	...	...	...	...
			2	20	...	...	...	...	...	...	20	1,350	700	50	...	...	50	...	2,150	200	50	...	...	...	...	...	250
			3	842	215	44	27	...	...	7	1,135	295	46	11	22	...	...	11	385	60	...	...	...	...	...	...	60
			4	2,124	441	209	16	18	40	27	2,877	1,286	147	40	...	40	...	...	1,513	...	...	...	...	...	...	...	...
			5	4,032	1,042	54	28	133	56	43	5,388	131	58	...	...	...	...	...	189	207	13	13	...	...	...	...	233
	Total	...	...	7,041	1,723	307	73	151	96	77	9,468	3,148	951	101	22	40	50	11	4,323	467	63	13	...	...	...	...	543
VIII.—Rawasan	...	...	1	1,188	675	17	130	32	33	18	2,093	115	18	...	...	...	...	...	133	18	51	32	32	...	...	...	133
			2	364	52	...	16	...	...	...	432	1,460	144	...	80	...	80	...	1,764	...	...	...	...	...	...	...	...
			3	4,359	885	45	232	7	65	...	5,593	1,303	173	...	109	...	...	...	1,585	77	24	7	7	...	...	...	115
			4	1,085	396	104	80	15	...	...	1,680	249	15	...	...	...	...	..	264	225	15	15	15	35	...	...	305
			5	4,684	1,067	183	183	41	...	...	6,158	...	...	...	...	...	...	...	...	173	...	91	...	23	...	...	287
			6	3,040	1,137	103	390	240	28	54	4,992	836	92	37	46	14	...	...	1,025	141	34	...	20	...	...	...	195
			7	261	42	...	48	21	...	...	372	408	21	27	27	48	...	...	531	126	...	...	...	21	...	...	147
	Total	...	...	14,981	4,254	452	1,079	356	126	72	21,320	4,371	463	64	262	62	80	...	5,302	760	124	145	74	79	...	...	1,182

APPENDIX J(4).

Table of contents of Compartments—(continued).

GORI RANGE.

Block.	Number of compartments.	Bakli.								Dhaura.								Gosam.							
		IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
IX.—Luni	1	2,012	1,318	161	350	290	17	60	5,108	1,099	50	34	...	...	...	...	1,183	102	...	...	...	...	...	...	102
	2	354	513	..	212	..	36	159	1,274	905	265	159	318	53	265	265	2,230	1,590	318	477	...	...	...	...	2,385
	3	3,741	862	108	266	5	...	...	4,982	616	21	...	...	...		...	637	136	...	...	...	...	...	..	136
	4	456	147	14	63	30	32	76	818	1,834	498	66	445	115	125	85	3,168	539	105	53	11	17	...	...	725
	5	76	33	...	...	...	...	...	109	3,204	275	14	53	59	25	...	3,630	62	24	...	..	...	...	4	90
	6	21	...	...	...	...	...	...	21	855	67	11	7	4	2	6	952	3	4	1	1	...	...	1	10
	7	306	222	95	137	42	147	53	1,002	956	316	...	127	32	42	21	1,494	914	158	63	42	32	...	...	1,209
	8	1,092	228	23	45	13	13	5	1,419	217	7	...	...	...	...	...	224	59	16	...	...	...	..	...	75
	9	785	387	75	24	16	86	56	1,429	677	149	22	66	2	66	64	1,026	584	160	16	..	8	...	..	768
	10	1,335	157	71	215	27	...	19	1,824	1,540	92	12	74	18	...	18	1,764	261	49	76	...	13	...	18	417
	11	4,232	1,675	470	601	117	559	175	7,829	513	13	...	...	...	...	...	526	2,009	120	193	...	23	...	9	2,354
Total ...	...	15,310	5,542	1,017	1,913	540	890	603	25,815	12,416	1,753	318	1,090	283	525	459	16,844	6,259	954	879	54	93	...	32	8,271
X.—Amgadi	1	2,753	927	174	223	21	...	12	4,110	25	12	...	...	12	...	...	49	167	12	...	...	...	...	...	179
	2	1,064	373	30	60	15	15	...	1,557	165	12	...	...	...	...	...	177	192	51	..	12	...	...	..	255
	3	2,054	943	240	312	48	72	24	3,693	14	...	...	...	...	...	...	14	840	264	120	96	...	...	24	1,344
Total ...	..	5,871	2,243	444	595	84	87	36	9,360	204	24	...	...	12	...	...	240	1,199	327	120	108	...	...	24	1,778
XI.—Mandhal	1	2,798	406	56	406	58	...	20	3,744	220	...	...	...	...	...	...	220	60	60	60	...	...	...	.	180
	2	1.853	584	68	206	67	66	78	2.922	50	...	...	16	...	...	...	66	299	88	...	...	16	5	22	430
	3	8,643	1,330	668	159	215	71	...	11,086	629	23	47	...	37	...	...	736	182	118	24	...	23	23	47	417
	4	1,664	1,208	288	496	120	168	91	4,025	5,886	80	80	...	...	...	...	6,046	731	350	290	170	200	...	50	1,791
	5	444	166	49	40	32	10	23	764	185	32	...	...	...	...	...	217	32	10	...	...	.	...	...	42
	6	2,793	715	102	136	102	136	34	4,018	646	68	...	34	68	...	...	816	170	...	...	34	34	...	34	272
	7	3,604	1,966	629	689	205	299	342	7,734	1,813	224	41	29	29	...	..	2,136	1,207	183	274	146	87	29	36	1,962
	8	1,575	252	101	214	151	25	25	2,343	126	25	...	12	...	...	...	163	151	25	25	51	25	...	25	302
	9	1,431	315	144	182	60	16	14	2,162	792	43	24	...	23	...	...	882	307	62	46	50	33	...	33	531
	10	745	698	188	387	133	144	67	2,362	3,066	138	18	18	...	18	...	3,258	259	185	94	59	33	3	60	693

	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	12	...	...	...	...	...	...	...	...	Not valued.		...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	25,550	7,640	2,293	2,915	1,143	925	694	41,160	13,413	633	210	109	157	18	...	14,540	3,398	1,081	813	510	451	60	307	6,620
XII.—Jogi Chaur	1	1,311	157	24	48	...	16	12	1,568	2,932	149	68	21	...	27	...	3,197	395	44	...	12	...	19	24	494
XIII.—Ardar Majhera ...	1	15	31	...	...	...	...	15	61	2,528	767	190	438	118	66	...	4,107	138	107	...	49	30	...	15	339
	2	292	44	6	53	36	7	65	503	7,273	367	29	36	...	36	36	7,777	2,360	137	108	36	...	58	29	2,728
Total ...	...	307	75	6	53	36	7	85	564	9,801	1,134	219	474	118	102	36	11,884	2,498	244	108	85	30	58	44	3,067
XIV.—Dogadda	1	1,738	1,089	154	407	44	165	11	3,608	110	22	...	...	...	...	...	132	473	185	55	66	...	66	11	836
	2	819	495	167	149	71	77	12	1,790	2,226	96	112	...	...	...	...	2,434	1,051	288	64	81	62	72	18	1,636
	3	1,064	532	153	186	131	43	121	2,230	2,564	87	49	...	...	...	...	2,700	290	121	66	16	43	27	110	673
	4	1,479	1,275	...	612	68	65	51	3,550	831	140	22	10	16	5	...	1,024	861	227	17	107	17	...	34	1,263
	5	...	...	..	...	...	...	...	...	638	426	70	267	71	31	...	1,503	..	...	...	14	...	...	...	14
	6	...	...	...	...	...	...	...	...	437	270	45	171	45	18	...	986	...	...	...	9	...	...	...	9
	7	...	...	...	...	...	...	...	...	194	129	21	82	21	8	...	455	...	...	...	4	...	...	..	4
Total ...	...	5,100	3,391	474	1,354	314	350	195	11,178	7,000	1,170	319	530	153	62	...	9,234	2,675	801	202	297	122	165	173	4,435
XV.—Kauria Chaur	1	...	29	58	...	...	...	...	87	7,723	1,925	294	543	69	58	...	10,612	182	129	...	25	...	...	...	336
	2	...	...	...	...	...	...	...	...	17,359	1,282	518	23	23	...	23	19,228	93	46	46	70	...	...	23	278
Total ...	...	...	29	58	...	...	...	...	87	25,082	3,207	812	566	92	58	23	29,840	275	175	46	95	...	...	23	614
XVI.—Bedasni	1	3,907	2,724	333	1,242	452	461	402	9,521	719	15	...	15	...	...	...	749	3,708	2,047	323	199	122	92	97	6,588
	2	5,426	914	111	179	...	35	35	6,700	143	...	...	...	...	...	...	143	2,672	191	97	32	64	16	16	3,088
	3	...	...	...	...	...	...	...	...	Not valued.		...	...	...	...	...	..	...	...	...	...	...	...	...	...
	4	...	...	...	...	...	...	...	...	Ditto		...	...	...	...	...		...	...	...	..	...	...	..	...
	5	3,796	3,515	38	1,642	226	515	164	9,896	2,158	356	106	19	...	..	...	2,639	2,108	496	159	159	159	53	53	3,187
	6	8,110	2,460	167	774	213	253	53	12,030	645	187	27	54	54	27	...	994	1,034	394	94	53	...	26	100	1,701
Total ...	...	21,239	9,613	649	3,837	891	1,264	654	38,147	3,665	558	133	88	54	27	...	4,525	9,522	3,138	673	443	345	187	266	14,564
XVII.—Kunau	1	4,124	1,851	167	651	375	768	418	8,354	2,116	198	58	50	20	...	...	2,442	2,616	913	402	195	252	348	166	4,892
	2	...	...	...	...	...	...	...	.	462	495	44	110	55	11	...	1,177	330	110	...	11	11	33	22	517
	3	4,668	3,160	88	630	25	220	34	8,825	3,692	706	142	37	16	...	...	4,593	1,286	528	...	125	27	158	...	2,124
	4	4,517	3,139	248	2,207	238	551	60	10,960	3,650	166	...	36	...	7	...	3,859	3,012	694	159	263	176	.	...	4,304
	5	3,150	1,827	126	777	126	441	315	6,762	4,725	357	105	...	42	...	...	5,229	3,570	861	873	84	126	63	42	5,619
	6	650	156	...	74	...	11	..	891	1,918	315	48	21	...	...	...	2,302	135	125	.	..	...	...	...	260
	7	3,603	1,894	96	863	164	429	147	7,196	5,280	305	101	14	32	...	...	5,732	2,150	1,256	309	501	171	135	161	4,683
Total ...	...	20,712	12,027	725	5,202	928	2,420	974	42,988	21,843	2,542	498	268	165	18	...	25,334	13,099	4,487	1,743	1,179	763	737	391	22,399

APPENDIX J(5).

Table of contents of compartment.

UDEYPUR RANGE.

Block.	Number of compartments.	Sisham.								Khair.								Jaman.							
		IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II. Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
I.—Gewai	1	...	...	...	...	...	...	...	...	149	37	...	...	...	...	...	186	185	146	45	33	20	22	22	473
	2	...	...	...	...	...	...	...	...	36	...	...	...	...	...	...	36	171	100	9	71	...	...	9	360
	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	965	457	53	149	74	53	117	1,868
Total ...	...	...	...	...	...	...	...	...	...	185	37	...	...	...	...	...	222	1,321	703	107	253	94	75	148	2,701
II.—Sukrau	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	244	201	23	68	3	2[illegible]	18	580
	2	...	...	...	...	...	...	...	...	7	...	...	...	...	...	...	7	370	121	23	46	7	2[illegible]	14	609
Total ...	...	...	...	...	...	...	...	...	...	7	...	...	...	...	...	...	7	614	322	46	114	10	51	32	1,189
III.—Sattikhala	1	...	...	...	...	...	...	...	...	113	14	...	...	...	...	...	127	168	46	11	14	7	14	27	307
	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	204	...	...	52	...	37	37	330
	3	...	...	...	...	...	...	...	...	324	96	36	...	...	...	...	456	441	278	21	22	37	...	11	810
Total ...	...	...	...	...	...	...	...	...	...	437	110	36	...	...	...	...	583	833	324	32	88	44	51	75	1,447
IV.—Gawlgarh	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79	60	14	34	6	2[illegible]	6	219
	2	...	...	...	...	...	...	...	...	54	19	...	...	...	...	...	73	783	502	136	142	33	73	27	1,696
	3	...	...	...	...	...	...	...	...	36	...	...	...	...	...	...	36	126	47	15	24	...	6	...	218
	4	...	...	...	...	...	...	...	...	120	26	...	...	...	...	...	146	1,530	510	40	170	60	60	3[illegible]	2,400
	5	...	...	...	...	...	...	...	...	133	...	...	...	...	...	...	133	765	321	13	26	78	13	3[illegible]	1,255
Total ...	...	...	...	...	...	...	...	...	...	343	45	...	...	...	...	...	388	3,283	1,440	218	396	177	172	102	5,788
V.—Malan	1	...	...	...	...	...	...	...	...	167	...	...	...	...	...	...	167	279	262	32	64	7	16	16	676
	2	...	...	...	...	...	...	...	...	130	...	...	...	...	...	...	130	1,116	197	57	...	...	...	57	1,427
Total ...	...	...	...	...	...	...	...	...	...	297	...	...	...	...	...	...	297	1,395	459	89	64	7	16	73	2,103
	1	...	...	...	...	...	...	...	...	484	...	...	...	...	...	...	484	...	...	...	...	...	...	...	...
	2	...	...	...	...	...	...	...	...	196	6	...	...	...	...	...	202	...	...	...	...	...	...	...	...
	3	...	...	...	...	...	...	...	...	231	...	...	...	...	...	...	231	...	...	...	...	...	...	...	...
	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

VI.—Sigadi ...	5	...	...	...	...	...	...	...	...	12	...	...	...	...	...	...	12	...	...	...	...	...	...	...	...
	6	117	31	...	2	...	...	...	150	211	7	...	3	...	...	...	221	...	...	...	...	...	...	...	...
	7	31	...	...	...	...	...	...	31	363	14	...	14	31	...	...	422	...	...	...	...	...	...	...	...
	8	...	...	...	...	...	...	...	...	33	...	...	...	...	...	...	33	169	45	...	...	...	...	33	247
	9	...	...	...	...	...	...	...	...	313	19	...	...	...	...	...	332	266	114	19	19	...	...	...	418
	10	...	...	...	...	...	...	...	...	1,699	15	...	...	...	...	...	1,714	...	15	...	...	...	...	...	15
	11	...	...	...	...	...	...	...	...	422	42	...	24	...	...	...	488	...	...	...	...	...	...	...	...
	12	3,746	130	...	5	...	...	...	3,880	586	6	...	...	...	...	...	592	...	46	11	23	11	...	...	91
	13	555	33	...	...	...	...	...	589	1,381	...	...	...	...	...	...	1,381	...	...	...	...	...	...	...	...
	14	2,599	191	...	...	...	...	...	2,790	105	...	...	...	...	...	...	105	...	...	...	...	...	...	...	...
	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	16	170	37	...	...	...	...	...	207	90	...	...	...	...	...	...	90	35	80	...	9	...	18	...	142
	17	...	...	...	...	...	...	...	...	326	11	...	...	...	...	...	337	277	253	47	21	...	7	...	605
	18	...	...	...	...	...	...	...	...	128	24	...	...	...	...	...	152	177	136	...	17	8	...	...	338
	19	...	...	...	...	...	...	...	...	864	40	...	...	...	...	...	904	527	156	74	228	84	17	17	1,053
	20	...	...	...	...	...	...	...	...	570	...	...	...	...	...	...	570	42	21	...	30	...	30	...	123
	21	...	...	...	...	...	...	...	...	117	...	...	...	...	...	...	117	747	357	49	79	38	10	43	1,323
	22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	7,218	422	...	7	...	...	...	7,647	8,131	184	...	41	31	...	...	8,387	2,240	1,223	200	426	91	82	93	4,355
VII.—Laldhang ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	521	238	36	79	23	11	48	956
	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20	...	...	...	...	...	...	20
	3	...	...	...	...	...	...	...	...	154	22	...	...	...	...	...	176	140	102	75	41	20	...	41	419
	4	...	...	...	...	...	...	...	...	334	...	...	...	...	...	...	334	18	...	...	...	...	...	...	18
	5	...	...	...	...	...	...	...	...	252	...	...	...	...	...	...	252	332	88	58	15	28	30	28	579
Total ...	...	...	...	...	...	...	...	...	...	740	22	...	...	...	...	...	762	1,031	428	169	135	71	41	117	1,992
VIII.—Rawasan ...	1	...	...	...	...	...	...	...	...	310	...	...	...	...	...	...	310	110	37	18	18	...	...	...	183
	2	...	...	...	...	...	...	...	...	316	32	...	...	...	...	...	348	52	104	40	...	20	16	...	232
	3	...	...	...	...	...	...	...	...	821	11	...	...	...	...	...	832	...	...	...	...	...	...	...	...
	4	...	...	...	...	...	...	...	...	82	4	...	...	...	...	...	86	...	20	...	...	...	...	...	20
	5	...	...	...	...	...	...	...	...	599	...	...	...	...	...	...	599	785	123	25	50	...	66	..	1,049
	6	...	...	...	...	...	...	...	...	496	14	...	...	14	...	...	524	205	123	...	...	...	...	...	328
	7	...	...	...	...	...	...	...	...	264	48	...	...	...	...	...	312	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...	2,888	109	...	...	14	...	...	3,011	1,152	407	83	68	20	82	...	1,812
										GOBI RANGE.															
IX.—Luni ...	1	...	...	...	...	...	...	...	...	468	...	17	...	...	...	...	485	209	93	50	...	...	17	...	369
	2	...	...	...	...	...	...	...	...	106	...	36	...	...	...	...	142	252	36	...	36	36	...	...	360
	3	...	...	...	...	...	...	...	...	623	...	..	...	...	...	...	623	445	375	75	21	...	...	...	916
	4	1,022	12	...	1	...	...	...	1,035	1,030	14	21	...	...	...	...	1,065	161	147	15	80	26	...	...	429
	5	2,010	63	...	4	...	...	...	2,077	2,849	49	74	...	...	...	...	2,972	24	...	...	...	...	...	...	24
	6	1,167	42	...	3	...	...	...	1,212	20	1	1	...	...	...	...	22	7	3	...	...	...	...	2	12
	7	1,338	37	...	...	...	...	...	1,375	1,062	42	...	...	...	...	...	1,104	...	...	...	...	...	21	...	21
	8	...	...	...	...	...	...	...	...	563	29	...	...	...	...	...	592	61	83	...	...	...	21	...	145
	9	...	...	...	...	...	...	...	...	184	...	...	...	...	...	...	184	...	...	...	8	...	8	...	16
	10	...	...	...	...	...	...	...	...	221	...	...	...	...	...	...	221	331	37	...	...	19	...	36	423
	11	5,354	325	...	27	...	3	...	5,709	959	...	...	...	13	...	...	972	...	...	...	...	...	...	...	...
Total ...	...	10,891	479	...	35	...	3	...	11,408	8,085	135	149	...	13	...	...	8,382	1,490	774	140	145	81	47	38	2,715

APPENDIX J(5).

Table of contents of compartments—(concluded).

GORI RANGE.

Block.	Number of compartments	Sisham.								Khair.								Jaman.							
		IV Class.	III Class.		II Class		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound	Unsound.	Sound.	Unsound.	
X.—Amgadi	1	...	...	...	...	...	...	...	...	555	37	...	...	...	...	...	592	43	21	...	...	...	...	...	64
	2	...	...	...	...	...	...	...	...	206	15	...	...	...	...	...	22	231	82	...	...	...	...	13	326
	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	147	70	56	...	14	7	14	308
Total ...	...	...	...	...	...	...	...	...	...	761	52	...	...	...	...	...	813	421	173	56	...	14	7	27	698
XI.—Mandhal	1	...	...	...	...	...	...	...	..	1,404	108	...	...	...	...	...	1,512	124	10	...	...	...	...	..	134
	2	33	...	...	...	...	...	...	33	1,593	29	60	...	33	...	...	1,715	38	16	...	...	...	...	...	49
	3	27	54	...	41	...	...	...	122	1,503	212	71	24	47	...	...	1,857	13	...	13	...	14	...	...	40
	4	...	...	...	...	...	...	...	...	624	...	...	...	...	...	...	624	10	10	...	...	...	...	...	20
	5	44	40	...	...	...	..	...	84	216	4	...	...	...	...	...	220	14	...	10	10	10	.	...	44
	6	816	180	12	156	...	24	...	1,188	852	12	36	...		...	...	900	34	...	...	...	...	..	68	102
	7	...	...	...	...	...	...	...	...	784	12	12	...	12	...	...	820	198	157	58	29	...	29	29	500
	8	38	12	12	13	...	...	...	75	1,096	...	63	...	12	...	...	1,171	33	37	...	13	...	.	...	88
	9	165	23	...	...	...	...	...	188	455	...	...	...	...	...	...	455	80	33	...	31	14	...	...	158
	10	...	...	...	...	...	...	...	..	255	...	...	...	...	...	36	291	...	...	...	...	...	...	...	...
	11	8,708	1,178	17	229	12	35	2	10,181	1,881	44	8	1	...	...	...	1,934	...	...	...	...	...	..	..	...
Total ...	...	9,831	1,487	41	439	13	59	2	11,871	10,663	421	250	25	104	...	36	11,499	544	263	81	83	38	29	97	1,135
XII.—Jogi Chaur	1	...	...	...	...	...	..	...	...	24	...	...	...	...	...	...	24	152	28	...	12	...	21	16	229
Total ...	...	...	...	...	...	...	...	...	...	24	...	...	...	...	...	...	24	152	28	...	12	...	21	16	229

XIII.—Ander-Majhera ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	63	78	...	19	...	70	88	318
	2	...	...	...	...	...	...	...	...	29	...	7	...	...	...	...	36	159	94	101	72	137	...	65	628
Total ...	...	...	...	...	...	...	...	...	...	29	...	7	...	...	...	...	36	222	172	101	91	137	70	153	946
XIV.—Dogadda ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	594	594	44	242	22	44	..	1,540
	2	115	95	...	...	...	...	...	210	938	...	38	...	19	...	...	995	122	69	47	37	56	12	19	362
	3	...	...	...	...	...	...	...	...	791	55	82	...	...	...	...	928	60	77	...	...	27	...	...	164
	4	...	...	...	...	...	...	...	...	153	...	.	..	...	...	...	153	204	136	...	34	..	17	...	391
	5	8,649	1,475	57	349	27	70	12	10,689	1,696	63	1	1	1	...	...	1,762	14	14	...	17	...	42	...	87
	6	11,827	1,865	92	230	38	37	15	14,104	2,900	46	4	1	2	...	...	2,953	9	9	...	9	...	27	...	54
	7	...	...	...	...	...	...	...	...	42	3	2	...	...	...	...	47	4	4	...	4	...	13	...	25
Total ...	...	20,591	3,435	149	579	65	107	27	24,953	6,520	167	127	2	22	...	...	6,838	1,007	903	91	343	105	155	19	2,623
XV.—Kauria Chaur ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	13	...	...	...	17
	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	46	46	...	46	...	23	47	208
Total ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	46	46	4	59	...	23	47	225
XVI.—Bedasni ...	1	...	...	...	...	...	...	...	...	1,296	30	...	...	...	...	...	1,326	...	...	...	...	...	28	28	56
	2	...	...	...	...	...	...	...	...	853	27	..	...	...	...	...	880	81	...	...	...	...	...	...	81
	3									Not valued.															
	4									Ditto.															
	5	...	...	...	...	...	...	...	...	1,682	207	38	...	38	...	...	1,965	53	106	...	...	...	...	...	159
	6	...	...	...	...	...	...	..	...	1,898	160	20	...	...	...	...	2,078	53	54	...	...	...	...	...	107
Total ...	...	...	...	...	...	...	...	...	...	5,729	424	58	...	38	...	...	6,249	187	160	...	...	...	28	28	403
XVII.—Kunau ...	1	...	...	...	...	...	...	...	...	477	49	...	...	...	...	...	526	...	...	...	...	...	...	...	..
	2	99	55	...	...	...	...	...	154	...	...	...	...	...	...	...	...	...	...	...	..	...	...	..	..
	3	...	...	...	...	...	...	...	...	22	..	...	...	...	...	..	22	113	22	...	32	...	110	125	402
	4	36	36	...	...	...	...	...	72	1,116	36	36	...	...	...	...	1,188	100	111	6	13	13	...	16	259
	5	...	...	...	...	...	...	...	...	210	...	21	...	...	...	...	231	105	84	21	.	...	...	42	252
	6	912	38	...	...	...	...	...	950	59	...	.	...	...	...	...	59	38	38	.	38	...	...	...	114
	7	...	16	...	...	...	...	...	16	504	64	64	...	...	...	...	632	49	113	...	47	17	16	16	258
Total ...	...	1,047	145	...	...	...	...	...	1,192	2,388	149	121	...	...	...	...	2,658	405	368	27	130	30	126	199	1,285

APPENDIX J (6).

Table of contents of Compartments.

UDEPUR RANGE.

Block.	Number of compartments.	Sandhan.								Tendu.								Chir.							
		IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
I.—Gewai	1	2,739	194	...	10	...	...	...	2,943	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	2,734	147	22	..	...	...	...	2,903	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	2,851	177	24	23	...	...	...	3,075	...	...	...	...	...	...	..	...	...	...	...	...	...	...	..	...
Total ...	...	8,324	518	46	33	...	...	...	8,921	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...
II.—Sukrau	1	607	28	...	...	...	...	...	635	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	396	7	...	...	...	...	...	403	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..
Total ...	...	1,003	35	...	...	...	...	...	1,038	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
III.—Sattikhala	1	1,401	127	7	...	...	...	...	1,535	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	2,977	93	93	15	15	...	...	3,193	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...
	3	3,824	168	54	21	11	...	...	4,078	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	8,202	388	154	36	26	...	...	8,806	...	...	...	...	...	...	.	...	...	...	...	...	...	...	...	...
IV.—Gwalgarh	1	2,641	150	56	..	...	...	...	2,847	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	2,056	201	71	11	11	...	...	2,350	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	2,431	50	22	. .	...	...	...	2,503	12	...	...	...	...	...	...	12	...	...	...	. .	...	...	...	...
	4	3,172	116	40	26	10	...	...	3,364	...	...	...	...	. .	...	...	...	30	...	...	...	...	...	...	30
	5	3,439	310	25	60	25	...	...	3,859	...	...	...	...	..	...	...	...	75	113	...	113	...	112	...	413
Total ...	...	13,739	827	214	97	46	...	...	14,923	12	...	...	...	...	...	...	12	105	113	...	113	...	112	...	443

V.—Malan	1	4,741	402	51	16	...	...	...	5,210	7	...	...	...	...	...	...	7	...	...	...	...	...	...	...	...
	2	7,868	525	173	133	33	...	...	8,732	...	...	...	...	...	...	...	...	199	299	...	300	...	300	...	1,098
Total ...	...	12,609	927	224	149	33	...	...	13,942	7	...	...	...	...	...	...	7	199	299	...	300	...	300	...	1,098
VI.—Sigadi	1	2,078	88	22	...	...	...	...	2,188	1,818	88	..	...	...	...	...	1,906	...	...	...	...	...	...	...	...
	2	1,626	56	18	...	...	...	...	1,700	5,350	25	175	...	25	...	...	5,575	...	...	...	...	...	...	...	...
	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	..	
	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	634	...	24	...	...	...	...	658	1,244	158	85	48	...	...	...	1,535	...	...	...	...	...	...	...	...
	6	3,589	220	130	...	...	...	...	3,939	3,860	896	16	..	...	...	...	4,772	...	...	...	...	...	...	...	...
	7	2,713	44	...	29	...	...	...	2,786	2,357	266	123	63	63	31	...	2,903	...	...	...	...	...	...	...	...
	8	3,762	67	...	...	...	...	...	3,829	406	45	11	11	...	...	...	473	...	...	...	...	...	...	...	...
	9	3,214	171	19	...	...	...	...	3,404	107	23	...	...	...	...	...	130	..	...	...	...	...	...	...	...
	10	3,617	...	...	...	...	...	...	3,617	403	15	15	...	...	...	...	433	...	...	...	...	...	...	..	...
	11	2,667	154	24	...	...	...	...	2,845	3,380	434	151	17	...	...	5	3,987	...	...	...	...	...	...	..	...
	12	4,488	23	18	4	...	...	...	4,533	4,556	433	115	24	...	...	...	5,128	...	...	...	...	...	...	...	...
	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	14	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	16	2,249	79	17	...	...	...	...	2,345	283	24	8	...	...	...	...	315	...	...	...	...	...	...	...	...
	17	1,680	182	...	8	...	...	...	1,870	58	...	...	...	...	...	...	58	...	...	...	...	...	...	...	...
	18	638	16	...	...	...	...	...	654	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25	25
	19	2,970	117	35	...	...	...	...	3,122	1,395	135	45	...	...	...	...	1,575	...	...	...	...	...	...	...	...
	20	4,353	140	80	...	...	10	...	4,583	822	75	25	...	...	...	...	922	...	...	...	...	...	...	...	...
	21	3,254	340	97	25	...	...	...	3,716	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..
Total ...	...	43,532	1,697	484	66	...	10	...	45,789	26,039	2,617	769	163	88	31	5	29,712	...	...	...	...	...	...	25	25
VII.—Rawasan	1	1,276	34	22	...	...	...	...	1,332	...	...	...	...	...	...	...	...	136	135	...	79	...	418	...	768
	2	960	...	...	...	...	...	...	960	...	...	...	...	...	...	...	...	..	...	...	...	...	..	...	...
	3	1,314	143	27	...	...	...	...	1,484	...	...	...	...	...	...	...	...	326	68	...	27	...	48	...	469
	4	3,037	49	...	...	9	...	...	3,095	...	...	...	...	...	...	...	...	80	200	...	80	...	80	...	440
	5	2,784	86	28	...	...	...	...	2,898	90	...	...	...	...	...	...	90	93	66	...	...	...	30	...	189
Total ...		9,371	312	77	...	9	...	...	9,769	90	...	...	...	...	...	...	90	635	469	...	186	...	576	...	1,866
VIII.—Laldhang	1	3,893	258	51	37	...	...	...	4,239	1,530	97	...	...	...	...	...	1,627	...	9	...	8	...	...	...	17
	2	3,280	160	100	...	...	...	...	3,540	512	56	...	...	...	...	...	568	...	...	...	...	...	...	...	...
	3	5,133	156	22	...	...	...	...	5,311	88	...	...	...	...	...	...	88	379	238	...	68	...	17	...	702
	4	2,123	139	40	...	...	...	...	4,302	96	30	...	...	...	...	15	156	21	21	21	...	...	...	21	84
	5	...	...	...	...	...	...	...	...	142	...	...	...	...	...	...	142	...	...	...	...	...	...	...	...
	6	2,473	35	84	...	...	...	...	2,592	848	28	...	...	...	...	...	955	84	105	...	84	...	...	...	273
	7	1,270	...	...	21	...	...	...	1,291	555	42	...	...	...	...	...	624	...	...	...	...	...	...	...	...
Total ...		18,172	748	297	58	...	...	...	19,275	3,771	253	...	...	...	...	15	4,160	484	373	21	160	...	17	21	1,076

APPENDIX J(7).

Table of contents of Compartments.

GORI RANGE.

Block.	Number of Compartments.	Sandhan. IV Class.	Sandhan. III Class. Sound.	Sandhan. III Class. Unsound.	Sandhan. II Class. Sound.	Sandhan. II Class. Unsound.	Sandhan. I Class. Sound.	Sandhan. I Class. Unsound.	Sandhan. Total.	Tendu. IV Class.	Tendu. III Class. Sound.	Tendu. III Class. Unsound.	Tendu. II Class. Sound.	Tendu. II Class. Unsound.	Tendu. I Class. Sound.	Tendu. I Class. Unsound.	Tendu. Total.	Chir. IV Class.	Chir. III Class. Sound.	Chir. III Class. Unsound.	Chir. II Class. Sound.	Chir. II Class. Unsound.	Chir. I Class. Sound.	Chir. I Class. Unsound.	Chir. Total.
IX.—Luni	1	3,391	33	67	...	...	...	...	3,491	794	...		...	...	...	...	794	...	...	...	...	...	...	...	...
	2	6,226	142	...	...	...	...	...	6,368	1,007	53	212	...	...	...	...	1,272	...	...	...	...	...	...	...	...
	3	5,651	95	134	...	...	...	...	5,880	160	..	...	...	...	...	...	160	...	...	...	...	...	...	...	...
	4	5,830	136	16	11	15	...	...	6,008	2,611	90	85	...	16	...	...	2,802	...	...	...	...	...	...	...	...
	5	144	...	...	...	...	...	...	144	20	...	...	...	...	...	...	20	...	...	...	...	...	...	...	...
	6	146	12	2	...	3	...	...	163	2	3	...	2	...	...	...	7	...	...	...	...	...	...	...	...
	7	1,727	116	21	...	...	...	...	1,864	541	73	38	1	...	...	...	653	...	...	...	...	...	...	...	...
	8	2,419	132	31	...	...	...	...	2,572	281	5	..	...	...	5	15	306	...	...	...	...	...	...	...	...
	9	4,449	155	49	...	...	...	8	4,661	1,972	166	8	...	...	...	...	2,146	...	...	...	...	...	...	...	...
	10	4,451	189	203	...	...	...	...	4,843	1,295	31	71	44	...	...	...	1,463	...	...	...	...	...	...	...	...
	11	8,161	141	31	...	4	...	...	8,337	2,239	340	69	...	22	...	...	2,648	...	...	...	...	...	...	...	...
Total ...	...	42,595	1,141	554	11	22	...	8	44,331	10,922	761	483	47	38	5	15	12,274	...	...	...	...	...	...	...	...
X.—Amgadi	1	5,783	91	43	...	...	...	...	5,917	12	...	...	...	...	...	...	12	...	...	...	...	...	...	...	...
	2	1,894	205	86	...	13	...	...	2,198	...	...	...	...	..	...	...	...	26	52	...	26	...	...	...	104
	3	3,262	279	306	...	31	...	7	3,885	...	...	...	...	...	...	...	...	14	42	...	28	...	14	...	98
Total ...	...	10,939	575	435	...	44	...	7	12,000	12	...	...	...	...	...	...	12	40	94	...	54	...	14	...	202
XI.—Mandhal	1	2,786	60	60	...	...	...	...	2,906	1,300	...	60	60	...	...	...	1,420	...	...	...	...	...	...	...	...
	2	2,190	61	125	...	...	...	...	2,376	161	...	...	...	...	...	...	161	...	...	...	...	...	...	...	...
	3	3,134	60	24	...	...	...	...	3,218	138	13	...	...	...	...	...	151	...	...	...	...	...	...	...	...
	4	12,459	254	599	...	91	...	...	13,403	40	10	11	...	...	...	38	99	...	...	...	...	...	...	...	...
	5	1,288	41	51	8	...	...	...	1,388	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	1,226	68	24	34	...	...	...	1,362	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	7	6,123	359	270	...	...	...	...	6,752	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
	8	504	25	25	...	...	...	...	554	12	...	...	...	...	...	13	25	...	...	...	...	...	..	...	...

	9	2,756	17	40	...	...	...	...	2,813	14	...	...	...	...	...	...	14	...	...	...	...	...	...	...	...
	10	4,363	219	578	27	190	...	...	5,377	3	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...
	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	36,829	1,164	1,806	69	281	...	...	40,149	1,668	23	71	60	...	...	51	1,873	...	...	...	...	...	...	...	...
XII.—Jogi Chaur ...	1	1,529	120	48	...	24	...	...	1,721	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
XIII.—Ander Majhera ...	1	1,266	122	137	...	...	...	...	1,525	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	3,551	577	346	...	7	...	...	4,481	36	...	...	...	36	...	...	72	...	...	...	...	...	...	...	...
Total ...	...	4,817	699	483	...	7	...	...	6,006	36	...	...	...	36	...	...	72	...	...	...	...	...	...	...	...
XIV—Dogadda ...	1	4,389	363	209	...	33	...	...	4,994	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	1,474	28	14	...	...	...	...	1,516	19	6	...	...	...	6	...	31	...	...	...	...	...	...	...	...
	3	3,193	252	1,071	...	...	...	...	4,516	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	4	2,635	221	68	...	34	...	...	2,958	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	11,691	864	1,362	...	67	...	...	13,984	19	6	...	...	...	6	...	31	...	...	...	...	...	...	...	...
XV.—Kauria Chaur ...	1	795	76	35	...	4	...	4	914	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	360	...	...	...	...	...	...	360	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	1,155	76	35	...	4	...	4	1,274	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
XVI.—Bedasni ...	1	8,648	976	448	15	15	28	15	10,145	28	...	...	...	...	...	...	28	...	...	...	...	...	...	...	...
	2	2,913	64	...	...	...	...	...	2,977	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3				Not valued.									Not valued.											
	4				ditto.									ditto.											
	5	6,533	530	212	...	19	...	...	7,294	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	8,728	800	255	107	27	...	...	9,917	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	26,822	2,370	915	122	61	28	15	30,333	28	...	...	...	...	...	...	28	...	...	...	...	...	...	...	...
XVII.—Kunau ...	1	3,920	633	256	29	29	...	...	4,867	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	2	418	55	11	11	...	...	...	495	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	3	6,953	614	97	...	...	...	...	7,664	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	4	14,986	1,034	473	...	...	...	...	16,493	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5	16,337	966	231	42	42	...	...	17,598	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	6	1,730	178	...	...	...	...	...	1,908	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	7	14,443	1,423	1,040	22	97	...	16	17,041	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	58,767	4,903	2,108	104	168	...	16	66,066	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX J (8).

Table of contents of Compartments.

UDEPUR RANGE.

Block	Number of compartments.	Kokat.								All kinds.								Number of trees of all kinds per acre.							
		IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV. Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
I.—Gewai	1	18,261	4,471	739	633	209	192	158	24,663	33,309	8,333	1,113	1,597	376	936	558	46,222	47 11	11·78	1.57	2·26	·53	1·32	·78	65·35
	2	14,001	2,380	232	201	18	48	9	16,889	34,230	8,779	838	1,888	389	780	281	47,185	63 39	16 25	1 55	3.49	·72	1·44	·52	87·36
	3	7,719	1,358	180	170	64	96	32	9,619	23,248	6,724	473	1,241	288	562	275	32,811	57·69	16 68	1·17	3 08	·71	1·39	·68	81·40
Total ...	...	39.981	8,209	1,151	1,004	291	336	199	51,171	90,787	23,836	2,424	4,726	1,053	2,278	1,114	1,26.218	55·08	14 44	1·47	2·86	·63	1·38	·67	76·53
II.—Sukrau	1	10,765	3,156	306	463	55	310	70	15,125	23,200	7,876	595	1,131	202	567	224	33,795	49 30	16 75	1 26	2·40	·43	1 20	·47	71·81
	2	17,561	4,876	285	606	66	251	99	23,744	36,010	9,538	795	1,304	691	573	417	49,328	62 73	16 44	1 38	2 27	1·20	1 00	·72	85·74
Total ..	...	28,326	8,032	591	1,069	121	561	169	38,869	59,210	17,414	1,390	2,435	893	1,140	641	83,123	56 71	16 67	1·39	2·33	·85	1 08	·61	79·61
III.—Sattikhala ...	1	10,173	2,024	339	305	87	141	32	13,101	18,918	5,892	925	2,219	507	1,011	331	29,803	27·73	8·63	1 35	3 25	·74	1 48	·48	43 66
	2	25,340	3,810	360	746	46	255	46	30,603	41,752	9,327	977	2,319	354	1,350	657	56,736	60 68	13·55	1 42	3 37	·51	1·90	·95	82 44
	3	9,415	1,977	193	100	44	22	20	11,771	35,443	8,838	687	827	210	538	144	46,687	69·09	17 23	1·33	1·61	41	1·05	·28	91·00
Total ...	...	44,928	7,811	892	1,151	177	418	98	55,475	96,113	24,057	2,589	5,365	1,071	2,899	1,132	1,33,226	51·04	12·07	1 37	2 85	·51	1·54	·60	69·98
IV.—Gwalgarh ...	1	9,600	2,344	309	534	69	190	74	13,120	19,227	5,533	588	1,599	294	521	413	28,175	41 98	12 08	1 28	3·49	64	1 13	·90	61 50
	2	13,681	4,056	486	792	94	150	57	19,316	26,820	8,643	1,071	1,952	324	711	328	39,849	50 13	16 15	2·00	3·65	·60	1·33	·61	74 47
	3	10,880	2,076	152	425	83	139	77	13,832	27,143	5,158	506	1,064	387	538	349	35,045	63·41	11 81	1 18	2·48	·90	1 25	·81	81·84
	4	14,540	2,350	220	210	70	90	70	17,550	52,458	9,504	766	1,558	446	604	322	65,658	77 82	14·10	1 13	2 31	·65	·90	·47	97 33
	5	12,738	1,309	304	171	10	32	51	14,615	34,413	7,547	633	1,420	165	621	229	45,028	69·38	15 21	1·27	2·86	·33	1 25	·46	90 76
Total ...	...	61,439	12,135	1,471	2,132	326	601	329	78,433	1,60,061	36,285	3,564	7,593	1,616	2,995	1,641	2,13,755	62·16	14 00	1 37	2 93	·62	1·15	·63	82·86
V.—Malan	1	38,887	6,916	1,005	972	299	644	221	48,944	76,484	14,269	1,842	2,608	575	1,337	863	97,978	75·50	14·08	1·81	2 57	·57	1·32	·85	96·70
	2	24,730	2,271	503	142	57	140	52	27,895	55,405	9,375	1,632	1,694	187	1,267	363	69,923	65·18	11·01	1·92	1·99	22	1.49	·42	82 23
Total ...	...	63,617	9,187	1,508	1,114	356	784	273	76,839	1,31,889	23,644	3,474	4,302	762	2,604	1,226	1,67,901	70·79	12·68	1 86	2·31	·40	1 32	·65	90 08
	1	27,276	4,906	1,206	812	390	264	150	35,004	34,596	6,354	1,468	1,010	476	308	260	44,472	67·04	12 31	2·84	1·96	·92	·60	·50	86·17
	2	20,950	4,910	764	760	250	200	100	27,934	33,270	6,191	994	1,150	431	375	269	42,680	52 81	9·82	1·57	1·82	·68	·60	·42	67·72
	3	9,597	2,793	924	798	441	462	294	15,309	10,311	3,087	1,008	966	504	504	357	16,737	22·51	6·74	2·20	2·11	1·10	1·10	·77	36·53
	4	11,010	2,589	904	869	691	390	833	17,286	11,152	2,607	904	886	691	426	833	17,499	20·96	4·90	1·70	1·66	1·30	·80	1·56	22·88

VI.—Sigadi ...	5	5,711	1,282	847	387	266	242	314	9,049	11,637	2,134	1,089	592	314	290	411	16,468	22·00	4·03	2·05	1·11	·59	·54	·77	31·09
	6	23,330	6,309	1,433	720	261	426	85	32,564	37,232	8,943	1,733	1,687	415	745	154	50,909	41·64	10·00	1·93	1·88	·46	·83	·17	56·91
	7	33,128	5,593	1,176	1,208	347	519	235	42,206	52,264	8,094	1,415	1,988	544	622	418	65,345	60·48	9·36	1 63	2·30	·63	·72	·48	75·61
	8	10,961	1,412	124	67	22	45	...	12,631	35,545	3,907	280	505	145	202	122	40,706	104·51	11·48	·82	1·48	·42	·60	·36	119·67
	9	15,066	647	61	103	19	...	...	15,896	48,707	4,468	411	708	270	84	95	54,743	98 39	9·02	·83	1·43	·54	·17	·19	110 50
	10	25,706	801	231	179	45	...	...	26,962	67,676	5,238	1,059	1,577	232	187	75	76,044	78·14	6 04	1·22	1·82	·26	·21	·09	87·78
	11	24,409	4,685	893	495	186	447	152	31,267	52,226	8,735	1,329	1,847	532	630	405	65,704	49·20	8 24	1·25	1·74	·50	·59	·38	61·97
	12	39,494	6,040	1,952	1,332	963	802	360	50,943	64,297	9,473	2,349	2,310	1,047	1,390	179	81,245	43·90	6 46	1·20	1·57	·71	·94	·25	55·42
	13	9,995	1,141	616	595	467	248	248	13,310	12,080	1,224	616	595	467	248	248	15,478	19·86	2·01	1·01	·98	·76	·41	·41	25·44
	14	13,144	3,508	906	917	458	470	515	19,918	16,348	3,967	628	1,006	480	582	582	23,893	14·21	3·45	·80	·87	·41	·50	·50	20·74
	15	9,530	3,382	657	1,240	201	880	275	16,165	9,615	3,382	657	1,240	201	952	307	16,354	16·46	5·79	1·12	2·12	·34	1·63	·52	27·98
	16	20,272	5,666	853	1,240	415	679	353	29,478	33,184	7,656	1,061	1,659	486	861	355	45,262	44·20	10·22	1·41	2·21	·64	1·15	·47	60·30
	17	12,615	1,642	211	168	63	22	19	14 740	22,211	4,395	491	543	189	237	74	28,090	63·10	12 48	1·11	1·54	·39	·67	·21	79·50
	18	5,184	951	111	141	61	37	29	6,514	9,793	1,959	157	282	87	113	54	12,445	59·00	11·80	·94	1·70	·52	·68	·32	74·96
	19	25,660	5,282	1,275	960	286	435	186	34 084	46,100	9,555	1,687	1,799	349	1,044	250	60,784	48·12	9·97	1·76	1·88	·36	1·09	·26	63·44
	20	23,633	6,206	754	1,246	363	492	317	33 011	47,617	13,507	1,583	3,554	736	1,078	905	68,980	42·21	11·97	1·40	3·15	·65	·95	·80	61·13
	21	23,219	4,465	551	696	241	183	131	29,486	42,262	10,975	1,172	1,487	604	406	480	57,386	68·49	17·79	1·90	2·41	·93	·65	·78	93·00
	22	...	...	...	...	...	...	...	...	Not valued.			...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	3,89,890	74,210	16,449	14,933	6,436	7,243	4,596	5,13,757	6,98,123	1,25,851	22,391	27,391	9,150	11,284	7,033	9,01,223	46 66	8·41	1·50	1·83	·61	·75	·47	60 23
VII.—Laldhang ...	1	12,309	807	130	168	69	35	36	13,564	18,784	3,803	319	906	137	718	95	24,762	54·92	11·12	·93	2·64	·40	2·10	·27	72 38
	2	4,790	610	60	50	...	...	...	5,510	10,150	2,880	150	730	30	310	60	14,310	53·42	15·16	·79	3 84	·16	1·63	·31	75·31
	3	5,878	717	68	118	36	7	33	6,857	14,418	4,615	406	986	212	336	205	21,178	37 54	12·01	1·05	2·56	·55	·87	·53	55·11
	4	14,824	1,000	63	178	45	9	...	16 119	39,630	6,494	610	1,278	330	588	148	49,078	64 96	10 64	1·00	2 09	·54	·96	·24	80·43
	5	13,569	1,754	225	63	...	131	43	15,785	34,971	8,271	737	1,051	535	201	391	48,047	43·71	10·34	·92	1 31	·67	2·61	·49	60·05
Total ...	...	51,370	4,888	546	577	150	182	114	57,825	1,17,953	26,063	2,222	4,951	1,244	4,043	899	1,57,375	50 71	11·20	·95	2·12	·53	1·73	·31	67·55
VIII.—Rawasan ...	1	16,131	2,328	386	193	69	70	18	19 195	38,038	5,700	660	878	174	194	109	45,753	70·07	11·40	1·32	1·75	·35	·39	·22	91·50
	2	28,796	3,964	724	956	240	300	180	35,160	50,636	6,408	1,044	1,468	440	608	240	60,844	75 57	9·56	1·56	2·19	·65	·93	·35	90·78
	3	15,320	916	151	110	18	86	31	16,632	49,963	7,920	606	1,766	275	557	136	61,223	56 71	8·99	·68	2·00	·31	·63	·15	69·47
	4	7,530	644	143	175	58	89	94	8,733	21,843	4,101	705	819	186	290	151	28,095	39 50	7·40	1·18	1·40	·33	·54	·27	50·80
	5	21,318	1,619	335	178	...	107	...	23,557	39,490	8,420	1,327	2,559	511	746	123	53,176	45 13	9·60	1 51	2 99	·58	·85	·14	60·73
	6	29,663	2,920	443	253	...	..	105	33,384	61,251	8,491	1,365	2,327	582	1,213	331	75,560	62 31	8 61	1·38	2·36	·59	1·23	33	76·81
	7	24,789	3,285	460	618	408	348	555	30,463	33,433	4,593	703	822	525	348	555	40,979	60·78	8·35	1·27	1·49	·95	·63	1·00	74·47
Total ...	...	1,43,547	15,676	2,642	2,483	793	1,000	983	1,67,124	2,94,654	45,633	6,410	10,639	2,693	3,956	1,645	3,65,630	58·78	9·10	1·27	2·12	·53	·78	·32	72·90
										Gori Range.															
IX.—Luni ...	1	21,154	1,438	220	77	51	16	60	23,016	48,451	7,396	1,091	1,297	540	604	263	59,642	63·25	9·65	1·42	1·68	·70	·78	·34	77·82
	2	15,814	1,312	267	178	...	89	72	17,732	45,073	5,539	1,545	744	430	907	710	54,948	62·17	7·64	2 13	1·02	·59	1·25	·98	75·78
	3	36,151	2,677	255	441	58	75	...	39,657	69,103	12,549	2,032	2,705	265	1,072	52	87,778	59·06	10·72	1·73	2·31	·22	·92	·04	75·00
	4	29,371	2,768	566	354	134	152	64	33,409	55,650	5,715	992	2,162	534	687	399	66,139	50·13	5·14	·89	1·94	·48	·62	·36	59 56
	5	18,107	15,370	3,665	3,972	921	1,898	1,045	44,978	31,501	17,136	3,994	4,160	1,088	2,021	1,049	60,949	18·61	10 12	2·36	2·46	·64	1·19	·62	36·00
	6	30,439	9,497	4,263	2,452	1,152	899	1,474	50,176	37 838	12,133	4,423	3,052	1,252	1,017	1,539	61,254	30·07	9·54	3 51	2·42	1·00	·81	1 22	48·67
	7	19,784	3,704	484	630	168	63	21	24,854	27,823	4,975	701	1,042	274	368	179	35,162	40·21	7·24	1 02	1·51	·40	·53	·26	51·17
	8	12,459	1,011	208	93	36	16	...	13,823	25,916	3,340	528	612	277	119	75	30,867	60·69	7·82	1·23	1·43	·64	·28	·17	72·26
	9	21,423	2,070	246	230	48	99	38	24,154	37,879	5,334	674	813	344	752	387	46,183	36 78	5·18	·65	·79	·33	·73	·37	44·83
	10	27,818	2,616	333	258	87	137	18	31,268	43,121	5,031	1,026	1,035	321	216	289	51,039	50·00	5·83	1·19	1·20	·37	·25	·33	59·19
	11	46,615	2,951	469	267	190	201	96	50,789	24,913	5,937	1,797	986	458	806	330	85,227	45·12	3·57	1·07	·59	·27	·48	·20	51·30
Total ...	...	2,79,135	45,414	10,976	8,953	2,845	3,645	2,888	3,53,856	4,97,068	85,085	18,803	18,608	5,783	8,569	5,272	6,39,188	43 65	7·47	1·65	1·63	·50	·75	·46	56·11

APPENDIX J(9).

Table of contents of Compartments.

GOBI RANGE.

Block.	Number of Compartments.	Kokat.								All kinds.								Number of trees of all kinds per acre.							
		IV Class.	III Class.		II Class		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.	IV Class.	III Class.		II Class.		I Class.		Total.
			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.			Sound.	Unsound.	Sound.	Unsound.	Sound.	Unsound.	
X.—Amgadi ...	1	20,559	1,964	223	251	21	...	...	23,018	51,710	14,341	905	2,834	223	728	121	70,862	60·12	16·67	1·05	3·29	·25	·84	·14	82 36
	2	11,900	1,583	219	130	40	...	63	13,935	22,790	7,122	430	1,817	283	676	212	33,330	32·51	10·47	·63	2·67	·41	1·00	31	49 00
	3	4,686	949	204	55	55	24	14	5,987	17,900	4,721	1,072	937	301	287	225	25,443	47·10	12·42	2 82	2·46	·79	·75	·60	66·94
Total ..	...	37,145	4,496	646	436	116	24	77	42,940	92,400	26,184	2,407	5,588	807	1,691	558	1,29,635	48·12	13·63	1 25	2·91	42	·81	·29	67·43
XI.—Mandhal ...	1	20,876	1,944	214	190	10	58	20	23,312	36,058	5,360	802	1,398	424	216	284	44,542	38·77	5·76	·86	1·50	·45	·23	·30	47·87
	2	12,997	2,127	367	245	33	62	88	15,919	20,130	3,478	226	603	182	199	210	25,028	34·71	6 00	·39	1·04	·31	34	·36	43·15
	3	14,306	691	229	60	...	24	..	15,310	46,390	4,951	1,804	426	508	183	255	54,517	49·61	5·29	1 93	·45	·54	·19	·21	58·28
	4	37,776	2,102	728	398	227	11	10	41,252	68,087	5,658	2,390	1,743	951	291	384	79,504	57·80	4·80	2·01	1·48	·80	·24	·32	67·46
	5	4,776	689	258	64	60	22	10	5,879	7,778	1,329	468	210	126	46	74	10,031	33·52	5·72	2·01	·90	·54	·19	·31	43 19
	6	22,207	5,381	647	375	204	443	170	29,427	29,834	6,764	833	1,011	340	841	408	40,031	29·19	6·61	·81	·99	·33	·82	·40	39·15
	7	42,805	4,559	1,205	904	313	369	582	50,737	65,095	9,828	2,998	2,608	803	854	1,117	83,303	76·04	11·47	3·50	3·04	·92	1·00	1 30	97 27
	8	10,118	1,310	252	302	51	38	25	12,096	14,099	1,724	478	630	264	63	88	17,346	23·49	2·87	·79	1·05	·44	·10	·14	28 88
	9	17,640	1,305	333	197	46	87	16	19,624	28,754	2,828	1,656	629	396	170	240	34,673	45·07	4 43	2 60	·98	·62	·26	·37	54 33
	10	21,764	1,702	606	285	163	37	136	24,693	37,371	2,942	2,089	1,073	770	251	435	44,931	48·78	3 84	2·72	1·40	1·00	·32	·57	58 03
	11	...	...	...	...	...	...	...	...	...	..	Not	valued		...	.	Total .	45·70	5·79	1 77	1·33	·61	·40	·45	56 05
	12	.	...	...	...	...	...	...	..	...	...	Not	valued		...	...	...								
Total ...	...	2,05,265	21,810	4,839	3,020	1,107	1,151	1,057	2,38,249	3,53,596	44,862	13,744	10,331	4,764	3,114	3,495	4,33,906								
XII.—Jogi Chaur ...	1	9,556	1,301	173	242	101	303	114	11,790	26,467	3,770	509	1,327	369	1,000	422	33,864	33·58	4 78	65	1 68	·46	1·27	·53	42 95

XIII.—Ander-Majhera ..	1	21,276	4,559	1,647	1,172	592	788	477	30,511	33,606	7,851	2,005	1,981	801	1,014	688	47,946	45·47	10·62	2·71	2·68	1·08	1·37	·93	64·86
	2	33,873	4,782	1,535	668	389	389	353	41,989	60,157	7,726	2,427	1,312	1,030	817	973	74,442	105·52	13·55	4·25	2·30	1·80	1·43	1·70	130·55
Total ...	...	55,149	9,341	3,182	1,840	981	1,177	830	72,500	93,763	15,577	4,432	3,293	1,831	1,831	1,669	122,388	71·62	11·9	3·38	2·51	1·40	1·40	1·27	93·48
XIV.—Dogadda ...	1	10,263	2,002	209	110	88	55	22	12,749	24,288	7,942	847	1,936	297	847	187	36,344	31·54	10·31	1·10	2·51	·38	1·10	·24	47·18
	2	25,815	3,063	717	531	264	241	123	30,754	44,589	5,850	1,436	1,510	661	725	303	55,074	46·20	6·06	1·48	1·56	·68	·75	·31	57·04
	3	31,812	1,847	356	98	137	60	32	34,342	44,713	4,713	2,226	795	590	173	367	53,577	56·03	5·90	2·79	1·00	·74	·22	·46	67·14
	4	16,320	3,566	828	794	224	159	88	21,979	23,673	6,194	1,020	2,033	376	416	314	34,026	32·29	8·45	1·39	2·77	·51	·56	·42	46·39
	5	6,241	2,876	487	537	267	202	165	10,775	15,531	4,777	614	1,167	365	303	191	22,948	13·03	4·01	·51	1·00	·30	·25	·16	19·26
	6	8,312	3,271	750	627	309	298	217	13,784	23,485	5,461	891	1,047	394	380	241	31,899	30·94	7·19	1·17	1·37	·51	·50	·32	42·00
	7	6,243	2,878	488	537	267	203	165	10,781	6,483	3,014	511	627	288	224	169	11,316	6·73	3·13	·53	·65	·30	·23	·17	11·74
Total ...	...	105,006	19,503	3,835	3,234	1,556	1,218	812	135,164	182,762	37,951	7,545	9,115	2,971	3,068	1,772	245,184	29·57	6·14	1·22	1·47	·47	·49	·28	39·64
XV.—Kauria Chaur ...	1	36,082	7,384	1,677	1,085	429	491	566	47,714	48,710	9,875	2,094	1,867	536	553	729	64,364	44·89	9·10	1·93	1·72	·49	·51	·67	59·31
	2	28,649	4,601	778	517	129	135	106	34,915	95,260	10,268	1,569	1,180	198	297	579	109,321	109·49	11·80	1·80	1·35	·22	·34	·66	125·66
Total ...	...	64,731	11,985	2,455	1,602	558	626	672	82,629	143,970	20,143	3,663	3,017	734	850	1,308	173,685	73·64	10·30	1·87	1·54	·37	·43	·66	88·81
XVI.—Bedasni ...	1	25,456	2,817	467	445	141	117	137	29,580	44,485	9,192	1,678	2,243	872	1,036	1,216	60,722	47·32	9·78	1·78	2·38	·92	1·10	1·29	64·57
	2	21,761	1,252	99	135	33	78	83	23,441	40,802	3,643	442	603	286	277	276	46,329	66·34	5·92	·72	·98	·46	·45	·45	75·33
	3			Not valued.																					
	4				Ditto.																				
	5	65,643	8,153	986	1,136	486	578	332	77,314	83,501	14,199	1,683	2,514	1,053	1,488	708	105,146	60·72	10·32	1·22	1·82	·75	1·08	·51	76·42
	6	51,820	5,488	1,492	705	296	288	155	60,244	75,038	11,061	2,129	2,554	683	1,142	354	92,961	59·08	8·70	1·67	2·00	·53	·90	·28	73·16
Total ...	...	164,680	17,710	3,044	2,421	956	1,061	707	190,579	243,826	38,095	5,932	7,914	2,894	3,943	2,554	305,158	58·05	9·07	1·41	1·88	·68	·94	·61	72·64
XVII.—Kunau ...	1	22,669	3,056	879	208	215	136	148	27,311	36,864	7,254	1,823	1,357	912	1,371	851	50,432	41·60	8·19	2·05	1·53	1·03	1·54	·96	56·90
	2	11,517	2,552	715	253	132	209	154	15,532	12,980	3,322	770	396	198	264	187	18,117	40·69	10·41	2·41	1·21	·62	·82	·58	56·74
	3	31,778	4,437	560	710	409	375	290	38,559	51,626	11,427	959	1,890	524	1,130	582	68,138	43·38	9·60	·80	1·59	·44	·95	·49	57·25
	4	40,009	5,133	1,261	503	358	130	101	47,495	71,382	11,478	2,289	3,553	868	1,174	246	90,990	52·10	8·37	1·67	2·59	·63	·85	·18	66·39
	5	54,537	5,943	966	483	252	105	210	62,496	84,987	11,088	2,469	1,617	714	672	693	102,240	59·41	7·75	1·72	1·13	·50	·47	·48	71·46
	6	63,111	5,976	320	385	211	135	97	70,235	70,700	7,453	422	625	264	253	118	79,835	72·58	7·05	·43	·64	·27	·26	·12	81·95
	7	42,569	4,507	1,084	573	339	142	334	49,548	74,608	12,288	3,011	2,749	1,179	923	978	95,736	47·25	7·78	1·90	1·74	·74	·58	·62	60·61
Total ...	...	266,190	31,604	5,785	3,115	1,916	1,232	1,334	311,176	403,147	64,310	11,743	12,187	4,659	5,787	3,655	505,488	52·03	8·30	1·51	1·57	·6	·74	·47	65·22

APPENDIX K.

List of principal trees and shrubs in the Ganges Division made up from list on page 13 of Working Plan of Ganges Working Circle, with additions by Mr. A. F. Broun, Offg. Deputy Conservator of Forests.

Natural order.	Scientific name.	Vernacular name.	Tree, small tree, shrub, under shrub, climbers, &c.	Locality.
I.—Anonaceæ ...	Miliusa velutina ...	Dom-sál ...	T.	Common.
II.—Bixineæ ...	Flacourtia Ramontchi ..	Kandoi ...	S. T.	Common.
	Xylosma longifolium ...	Kandhera ...	S. T.	Dabina 46 near road. Rare.
	Cochlospermum Gossypium ...	...	S. T.	Southern slopes E. and near Laldhang.
III.—Tamarisineæ ...	Tamarix gallica ...	Jhau ...	S.	Along watercourses, *e.g.*, Bedasni.
	„ dioica ...			
IV.—Ternstromiaceæ ...	Saurauja nepalensis ...	Gogtia ...	S T.	Rare.
V.—Dipterocarpeæ ..	Shorea rubusta ...	Sál ...	T.	Well drained chaors, &c.
VI.—Malvaceæ ...	Kydia calycina ...	Pula ...	T.	Common.
	Bombax Malabaricum ...	Semul ...	T.	Common on low land.
VII.—Sterculiaceæ ...	Sterculia urens ...	Katira ...	T.	On dry rocky hills, *e. g.*, Dogadda 8.
	„ villosa ...	Udial ...	T.	
	Helicteres Isora ...	Maror-phal ...	S.	Common, dense in Kauria 1.
VIII.—Tiliaceæ ...	Grewia oppositifolia ...	Bhekla, bhengal ...	T.	Common in places.
	„ lævigata ...	Bhimal ...	T.	
	„ sclerophylla ...	...	U. S.	Chaukhamb and Chila northern boundary.
	„ sapida ...	Chota pharsái ...	U. S.	Burnt open forests.
	„ polygama ...	...	U. S.	
NOTE.—The genus Grewia is nothing like complete; probably several species might be added. Attention is drawn to a Grewia growing on Barwala and Andher Majharas.				
IX.—Lineæ ...	Reinwardtia trigyna ...	Piuli ...	U. S.	Common in deep cool sots.
X.—Malpighiaceæ ...	Hiptage Madablota ...	...	Cl.	In damp shady places.
XI.—Rutaceæ ...	Glycosmis pentaphylla ...	Potla ...	U. S.	Under shady and low-crowned trees, common at Morghati.
	Limonia acidissima ...	Katbel ...	S. T.	Dark and shady places.
	Murraya exotica ..	Juti ...	S.	Deep dark sots.
	„ Kœnigii ...	Gandela gani ...	S.	Shady moist places.
	Ægle Marmelos ...	Bel ...	T.	Fairly common, especially near Kumaun.
XII.—Burseraceæ ...	Boswellia Serrata ...	Salai Guggar ...	T.	On dry exposed slopes, Maili sot, &c.
	Garuga pinnata ...	Katula ...	T.	Common in outer forests.
XIII.—Meliaceæ ...	Cedrela Toona ...	Tun ...	T.	Common along streams.
XIV.—Olacineæ ...	Olax nana (?) ...	...	U. S.	Chandi Hill near Peli.
XV.—Celastrineæ ...	Celastrus paniculata ...	...	Cl.	Not rare.
	Elæodendron Roxburghii ...	Dhebri Paniali ...	T.	Sukhrau, Kohtri, &c.
XVI.—Rhamneæ ...	Zizyphus nummularia ...	Ber ..	S.	Outer lower forests.
	„ vulgaris ...	„ ...	S.	
	„ xylopyrus ...	Katber ...	S. T.	
	„ rugosa ...	...	Cl.	Damp shady places, as Bethana, &c.
XVII.—Ampelideæ ...	Vitis repanda ...	...	Cl.	Common in places.
	„ latifolia ...	...	Cl.	
	„ carnosa ...	...	Cl.	
NOTE.—This genus wants studying, as probably more species will be found.				
	Leea Sambucina ...	...	U. S.	Rare, sál forests.
XVIII.—Sapindaceæ ...	Schleichera trijuga ...	Kosum, Gansam ...	T.	Common, south-west, south, and south-east slopes.
	Acer oblangum ...	Kirmoli ...	T.	Dhimki.
	„ lævigatum ...	Gair ..	T.	Dabina 47 near the sot.
XIX.—Anacardiaceæ ...	Rhus Cotinus ...	Tung, Ami ...	S.	High elevations, Bedasni 2.
	„ parviflora ...	Tunga, Renal ...	S.	
	Odina Wodier ...	Jhinghan ...	T.	Common in outer forests.
	Semecarpus Anacardium ...	Bhilawa ...	T.	Common in sál forests.
	Buchanania latifolia ...	Katbhiláwa ...	T.	Dry stony hills and undulating ground.
	Spondias Mangifera ...	Amra ...	T.	On low ground.
	Mangifera indica ...	Am ...	T.	Sub-montaneous.
XX.—Coriarieæ ...	Coriaria nepalensis ...	Masuri ...	S.	Occasionally near upper boundary.
XXI.—Moringeæ ...	Moringa pterygosperma ...	Sánjna ...	T.	Alluvial deposits of Málan, Binj, Luni, Sigadi, &c.
XXII.—Leguminosæ—				
(*a*) Papilionaceæ ...	Crotalaria sp. ...	Gungri ...	U. S.	Common.
	Indigofera sp. ...	Sakina ...	S.	Probably two species, found at all elevations on hill sides.
	Millettia auriculata ...	Ganj ...	Cl.	Abundant.
	Ougeinia dalbergioides ...	Sándan ...	S. T.	Abundant, slopes.
	Abrus precatorius ...	Rakti ..	Cl.	Not uncommon.
	Erythrina suberosa ...	Dauldhak madára ...	T.	Common on certain clayey soils and hot aspects.
	Pueraria tuberosa ...	Sirala, Bilaikand ...	Cl.	Common at foot of the hills.
	Butea frondosa ...	Dhák ...	T.	Common in outer forests.
	Flemingia strobilifera and other sp.	Bhadula ..	Herb or U. S.	Common.
	Dalbergia sissoo ...	Shisham and sissu ...	T.	Majharas, fresh alluvial deposits, &c.
	lanceolaria ...	Bandher ...	T.	Common in outer forests, Kotdwara, Saneh, Haldukhata, &c.
(*b*) Cæsalpinieæ ...	Cæsalpinia Bonducella ...	...	Cl. S.	Majhara, opposite Raiwalla.
	Cassia Fistula ...	Amaltas ...	T.	Common, especially on low clayey soils.

Natural order.	Scientific name.	Vernacular name.	Tree, small tree, shrub, under-shrub, climbers, &c.	Locality.
	Bauhinia racemosa ...	Umli, Kachnal ...	S. T.	Common.
	„ retusa ...	Saula, Kandla ...	„	Abundant in Bedasni 6 near main ridge; also found in Kohtri.
	„ malabarica ...	Khatua, Amli ...	„	Common.
	„ purpurea ...	Khairwál, Guiral ...	T.	Fairly common.
	„ vahlii ...	Maljhan, Malu ...	Cl.	Common.
	„ variegata ...	Kachnar ...	T.	Common.
(e) Mimoseæ ...	Mimosa rubicaulis ...	Agla, Kora ...	S.	Common on dry precipitous slopes and outer forests or islands in raus.
	Acacia eburnea ...	Pahari kikar, Bher ...	S. T.	Hot precipices.
	„ catechu ...	Khair ...	...	Majharas, alluvium.
	„ Intsia ...	Katrar ...	Cl.	Outer forests, foot of hills.
	Albizzia Lebbek ...	Kala siris ...	T	Not common, Audhermajhara chaur.
	„ stipulata ...	Ingal ...	T.	Majharas.
	„ odoratissima ...	Pahari siris ...	T.	Not common, cool sots.
	„ procera ...	Karra, Safed siris ...	T.	In moist soil, Gwalgarh sot, &c.
XXIII.—Rosaceæ ...	Pyrus pashia ...	Meal ...	T.	Kohtri nadi, Gangan sot.
XXIV.—Combretaceæ ...	Terminalia bellerica ...	Bhaira ...	T.	Outer forests.
	„ chebula ...	Her ...	T.	Cool forests, often with sál.
	„ tomentosa ...	Sain ...	T.	Abundant on clayey slopes.
	Anogeissus latifolia ...	Bakli, Dháwa ...	T.	Slopes, common.
	Combretum nanum ...	...	U. S.	Burnt grassy plains, fire-lines, &c.
XXV.—Myrtaceæ ...	Eugenia operculata ...	Paiman, rai jaman ...	T.	In damp cool places.
	„ jambolana ...	Jaman, phalinda ...	T.	Watercourses, jamania bagh.
	Careya arborea ...	Kumbi ...	S. T.	Outer forests and sál forests.
XXVI.—Lythrariæ ...	Woodfordia floribunda ...	Dahái ...	S.	Warm steep hill sides.
	Lagerstrœmia parviflora ...	Dhaura ...	T.	Abundant on poor or clayey soil.
XXVII.—Cacteæ ...	Opuntia dillenii ...	Nág-phana ...	S.	Burwala majhara near Ganges.
XXVIII.—Araliaceæ ...	Heptapleurum venulosum ...	Korsimal ...	Scandent shrub.	Kohtri nadi, Dabina 46 and 47.
XXIX.—Cornaceæ ...	Alangium Lamarckii ...	...	S. T.	Outer forests, abundant at Morghati.
XXX.—Samydaceæ ...	Cascaria graveolens ...	Chilla ...	S.	Sál forests and hill sides, rare.
	„ tomentosa ...	„ ...	T.	Outer forests, common.
XXXI.—Rubiaceæ ...	Adina cordifolia ...	Haldu ...	T.	Outer forests and alluvial soil.
	Stephegyne parvifolia ...	Keim, phaldu ...	T.	Outer forests and alluvial soil.
	Hymenodictyon excelsum ...	Bhaulan ...	T.	Outer forests and alluvial soil.
	Wendlandia exserta ...	Chilkiya, bithua, posara.	S. T.	Old landslips, loose and moist soil
	„ tinctoria ...	Katmolia ...	S.	Cool valleys in Kohtri nadi.
	Hyptianthera stricta ...	Gadera ...	S. T.	Canebrake below Kauria, chaur opposite Gori.
	Gardenia turgida ...	Thanolla ..	S T.	Clayey and poor soil.
	Randia tetrasperma ...	Bhutia gingaru ...	S.	Clayey soil with warm aspect.
	„ dumetorum ...	Mainphal ...	S.	Clayey soil with warm aspect.
XXXII.—Myrsineæ ...	Mæsa argentea ...	...	S.	Dhimki, near the stream.
	Ardisia humilis ...	Kat kumali ..	S.	Deep dark sots, Gangas, Kohtri, &c.
	Embelia robusta ? ...	...	S.	Kohtri.
XXXIII.—Ebenaceæ ..	Diospyros melanoxylon ...	Tendu ...	T.	Hill sides with clayey soil.
	„ embryopteris ...	...	T.	Very rare; one tree south edge of Kauria chaur above Dogadda sot.
	„ montana ...	Bisténdu ...	S. T.	Outer forests.
	„ lanceæfolia ? ...	...	S.	Outer forests.
XXXIV.—Styraceæ ...	Symplocos cratægoides ...	Lodh ...	S.	Dabina, common.
XXXV.—Oleineæ .	Nyctanthes arbor-tristis ...	Parijat, harsinghar...	S.	Dry stony slopes.
	Jasminum sp. ...	...	S.	Rare.
XXXVI.—Loganiaceæ ...	Buddleia asiatica ...	...	S.	Ravines, not common.
XXXVII.—Apocyneæ ...	Carissa spinarum ...	Karaunda ...	S.	Outer forests.
	Vallaris heynei ...	Dudhi ...	T.	Common (Hearle).
	Wrightia tomentosa ...	Darhela, dudhi ..	T.	Outer forests.
	Holarrhena antidysenterica ...	Dhudi, kura ...	T.	Outer forests.
	Nerium odorum ...	...	S.	Deep sots, Dhimki.
	Ichnocarpus frutescens ...	Dudhi ...	Cl.	Common.
XXXVIII.—Asclepiadeæ ...	Calotropis gigantea ...	Ak, madar ...	S.	Dry sandy places.
	Orthanthera viminea ...	...	U. S.	Raus, such as Sukh rau.
	This order requires further study.			
XXXIX.—Compositæ .. (See Gamble's Indian Woods, small type, as found in Kumaun.)	Glycomeris ...	Dhaya ...	S. T.	Outer hills near Laldhang, Ojalpani sot, Dabina, &c.
XL.—Boragineæ ...	Cordia myxa ...	Lasora ...	S. T.	Common, as Kankin chaur.
	„ vestita ...	Páimnan ...	S T.	Bedasni and near watercourses.
	Ehretia serrata ...	Púnyan ...	T.	Ditto moist ground.
	„ lævis ...	Chamror, koda ...	S. T.	Ditto ditto.
XLI.—Convolvulaceæ ...	Cuscuta reflexa ...	...	Parasite,	On bér bushes, &c., abundant on majharas opposite Maiapur
XLII.—Bignoniaceæ ...	Oroxylum indicum ...	Tarh, pharkat, sellee,	S. T.	Outer forests.
	Stereospermum suaveolens ...	Padal ...	T.	Common.
XLIII.—Acanthaceæ ...	Adhatoda vasica ...	Bashang, bunsa ...	U. S.	Common under ground in damp forests.

Natural order.	Scientific name.	Vernacular name.	Tree, small tree, shrub, under-shrub, climbers, &c	Locality.
	Acanthus or phlogacanthus sp.,	Kala bunsa ...	U. S.	Common under ground damp in forests
	Strobilanthes sp. ...	...	U. S.	Upper slopes.
	This order requires further study.			
XLIV.—Verbenaceæ ...	Callicarpa macrophylla ..	Daya, Giwala ...	S.	Outer low damp forests.
	Gmelina arborea ...	Khammara ...	T.	Rare near watercourses, easily mistaken for Trevia Nudiflora.
	Vitex Negundo ..	Shawáli ...	S.	Outer forests, Amsot.
	Holmskioldia Sanguinea ...	Kul-tolia ..	Cl	Cool sots or slopes, Dhamand.
	Premna mucronata ..	Bakar ...	S T.	Outer forests.
XLV.—Amarantaceæ ...	Deeringia celosioides ...	Kalalobari ...	Cl	Common in places.
XLVI.—Blygoxeæ ..	Polygonum sp. ...	...	Herb.	Common in damp places.
XLVII.—Loranthaceæ ...	Loranthus vestitus ..	Pand ...	Parasite.	Rather rare.
	" longiflorus ..	" ...	"	Common.
	This genus requires further study.			
XLVIII.—Lauraceæ ...	Tetranthera laurifolia ...	Meda lakri ...	T.	Low grounds near Chila.
	" monopetala ...	" " ..	T.	Near watercourses and damp sheltered localities.
	Phœbe lanceolata (?) ...	Káwal ...	T.	Near watercourses, Chaukham Dhimki, &c.,
	Machilus odoratissima ...	Kikra ...	T.	
XLIX.—Euphorbiaceæ ...	Euphorbia Royleana ...	...	Coctoid shrub.	Precipices and dry hot scarps.
	Excœcaria insignis ...	Khinna ...	S T.	Upper dry slopes.
	Trewia nudiflora ...	Bhillaur ...	T.	Very much like Gmelina and found near watercourses.
	Mallotus philippinensis ...	Riúna ...	S T.	Common outer forests.
	Bischoffia javanica ...	Kein ..	S. T.	Near watercourses, as Bedasni.
	Antidesma diandrum ...	Amli ...	S.	Cool dark places.
	Briedelia retusa ...	Garga ..	T.	Outer forests and outer slopes.
	" montana ...	Gauli, Kargnalia ...	T.	Sots and cool ravines.
	Putranjiva Roxburghii ...	Patji ..	T.	Low, dark forests.
	Phyllanthus nepalensis ...	Kat mowa, Buirmao	S. T.	Common on upper slopes, as Bedasni 6.
	" Emblica ...	Aunla ...	S T.	Common in outer forests.
	" lanceolarius ...	...	S. T.	Garhapani.
	" reticulatus ...	...	Scandent shrub.	Outer forests in damp ground.
	Securinega obovata ...	...	S.	Outer forests, Sanch, Luni, &c.
L.—Ulmaceæ ...	Ulmus integrifolia ..	Papri, Kunja ...	T.	Alluvial sandy deep soil.
	Celtis australis ...	Kharak ...	S.	Ditto Bedasni Kohtri.
	Sponia politoria ...	Khaksi ...	S.	Near streams on sandy soil.
LI.—Moraceæ ...	Morus serrata ...	Satut ...	T.	Koti chaur.
	Ficus bengalensis ...	Bargat ...	T.	Common.
	" Roxburghii ...	Timla ..	T.	Deep sots (Udepur).
	" infectoria ...	Pilkhan ...	T.	Not common, Kokat forests.
	" trachycarpa ...	...	S. T.	Ditto ditto.
	" religiosa ...	Pipal ...	T.	Common.
	" cordifolia ...	Pakar ...	T.	
	" cunia ...	Jharphal ...	T.	Along watercourses.
	Ficus glomerata ...	Gular ..	T.	
	" hispida .	Totmila ...	T.	
	" rapens ...	...	Cl.	Along Dabina 46 and 47.
	" tuberculata ...	...	S.	Deep sots, on stony ground, Dhimki, Chaukhamb, &c.
LII.—Artocarpeæ ...	Artocarpus Lakoocha ...	Katdhan ..	T.	Bedasni.
	Curdania Javanensis ..	Manda ...	S.	Common in few places.
LIII.—Urticaceæ ..	Bohmeria rugulosa ..	Genthi ...	S. T.	Common in cool places.
	" macrophylla ..	Saochála, golka .	S.	
	" platyphylla ...	Gargola ..	S.	
	Debregeasia bicolor ..	Tashiári ..	S.	
	This order needs further study.			
LIV.—Salicineæ ...	Salix tetrasperma .	Gadbains, Jalmala	S. T.	River banks. The only male specimen I have ever seen just below Chila chauki.
LV.—Cupuliferæ ...	Quercus incana ...	Banj ..	T.	Upper boundary, as Bedasni 6 and near Gajwar.
LVI.—Juglandeæ ...	Engelhardtia colebrookiana ...	Gadmowa ..	T.	Upper boundary, also in Dabina 47.
LVII.—Coniferæ ..	Pinus longifolia ..	Chir ..	T.	Common on high ridges, also in Dabina at about 1,500.
LVIII.—Palmæ ..	Phœnix sylvestris ...	Khajur ..	Palm.	Not rare.
	" acaulis .	Takal ..	"	On some very stony slopes.
	Wallichia densiflora ...	Luichya ..	"	Near road in Dabina 46.
	Calamus Rotang ...	Bet ..	"	Canebrake near Gori.
LIX.—Smilaceæ ...	Smilax sp. ...	Kukur Dara ..	C.	Not rare.
LX.—Dioscoreæ ...	Dioscorea sp. ...	...	C.	
LXI.—Graminæ ...	Dendrocalamus strictus ..	Bans ..	H.	Common.
	Cynodon dactylon ..	Dúb ...	H.	
	Saccharum Munja ...	Munj, Sikandar Sarkara.	H.	
	Exanthus olioaceris ...	Kans ..	H.	Common in beds of streams.
	Spodiopogon angustifolius ...	Bábar ...	H.	Common on clayey soil.
LXII.—Cyperaceæ ...	Kviophorum comosum ..	Ditto ...	H.	Common on warm aspects.

Beside the above I found at Dogadda, on the way from Kotdwara to Kaludanda, Osyris arboria, vern. Bakaria, belonging to Nat. Ord. Santalaceæ.

NAINI TAL:
The 28th July, 1888.

A. F. BROUN,
Deputy Conservator of Forests.

APPENDIX L.

No. $\frac{423F.}{647-10}$ OF 1888.

RESOLUTION.

REVENUE (FORESTS) DEPARTMENT.

Dated Naini Tal, the 21st July, 1888.

READ the undermentioned papers—

(1) Working Plan of the Ganges Working Circle, Ganges Forest Division, Central Circle.

(2) Letter from the Inspector-General of Forests to the Government of India, No. 971, dated 30th December, 1887.

(3) Letter from the Commissioner, Kumaun Division, No. $\frac{1696}{XXII-97}$, dated 8th June, 1888, and enclosure.

OBSERVATIONS.—The original draft of the above-mentioned Working Plan has been materially altered, and, in its present form has received the professional approval of the Inspector-General of Forests to the Government of India. The plan is defective in so far that it contains no forecast of the financial results of the operation of the Working Plan, and the Lieutenant-Governor and Chief Commissioner has consequently experienced some difficulty in arriving at a conclusion with respect to it. A detailed comparison should always be made in a Working Plan between the present yield, expenditure, surplus of the forest, and the estimated yield, expenditure and surplus when the Working Plan is put into force. It is gathered from the plan under consideration that the forests of the Ganges Working Circle have been much overworked, and that the reduction of the selection fellings from an average of 10,500 trees per annum to an average of 2,785 per annum is essential to the future improvement of the tract. Some decrease in receipts during the next 10 years is in these circumstances unavoidable, though, owing to the fact that the stock of the circle consists very largely of bamboos, and that the present annual outturn of these can be maintained, the decrease will be less than might be expected. It may be possible to further lessen the decrease if the early extension of fire conservancy should enable improvement felling operations to be made in other compartments than those specified in para. 131.

In sanctioning the plan, His Honor directs that the receipts and expenditure be carefully watched, and the question considered how far economies in Establishment can be enforced, in order to meet the estimated decrease in receipts.

The proposals as regards fire conservancy are approved with the exception of those relating to the Bedasni compartments, in which fire protection must not be undertaken without the special sanction of Government. A separate application can be made hereafter, if necessary, on this point.

With the above observations, the Lieutenant-Governor and Chief Commissioner is pleased to sanction the Working Plan of the Ganges Working Circle, which will have effect for a period of 10 years.

No. $\frac{424F.}{647-11}$.

COPY forwarded to the Inspector-General of Forests to the Government of India, for information.

No. $\frac{425F.}{647-12}$.

Copy also forwarded to the Commissioner, Kumaun Division, for information.

No. $\frac{426F.}{647-13}$.

Copy also forwarded to the Conservator of Forests, Central Circle, for information.

By order, &c.,

T. W. HOLDERNESS,

Secy. to Govt., N.-W. P. and Oudh.